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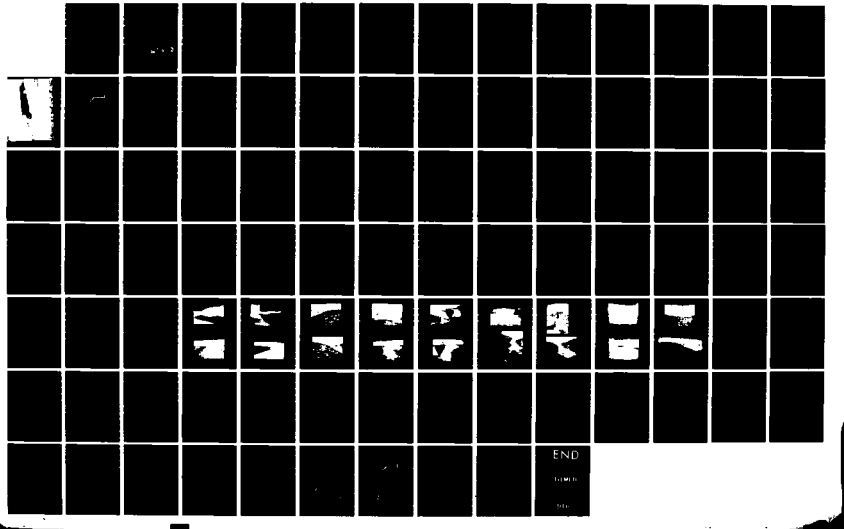
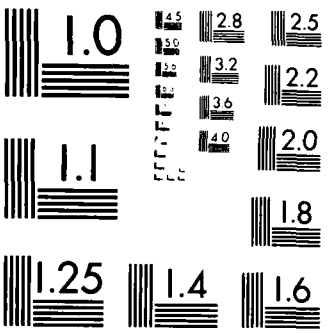




MERRIMACK RIVER BASIN

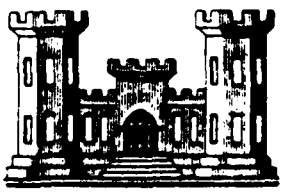
WENTWORTH, NEW HAMPSHIRE

BAKER FLOODWATER RESERVOIR SITE 6A

NH 00477

NHWRB NO. 249.15

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

JUNE 1979

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AD A 156 873

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Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Merrimack River Basin
Wentworth New Hampshire
Tural Brook

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The dam is a 730 ft. long 60 ft.high earthen structure. The visual inspection revealed that the dam is in excellent condition. The items noted in this report do not warrent a reduction in the assessed condition of the dam. It is intermediate in size with a high hazard potential. There are various remedial measures which should be implemented by the owner.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:
NEDED

SEP 29 1979

Honorable Hugh J. Gallen
Governor of the State of New Hampshire
State House
Concord, New Hampshire 03301

Dear Governor Gallen:

Inclosed is a copy of the Baker Floodwater Reservoir, Site-6A Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Water Resources Board, the cooperating agency for the State of New Hampshire. In addition, a copy of the report has also been furnished the owner, New Hampshire Water Resources Board, Concord, New Hampshire 03301.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Water Resources Board for your cooperation in carrying out this program.

Sincerely,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

BAKER FLOODWATER RESERVOIR SITE 6A

NH 00477

NHWRB 249.15

MERRIMACK RIVER BASIN
WENTWORTH, NEW HAMPSHIRE

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM
PHASE I - INSPECTION REPORT
BRIEF ASSESSMENT

Identification No.:	00477
Name of Dam:	Baker Floodwater Reservoir Site 6A
Town:	Wentworth
County and State:	Grafton, New Hampshire
Stream:	Tural Brook
Date of Inspection:	May 17, 1979

Baker Floodwater Reservoir Site 6A is a 730 foot long 60 foot high earthen structure. There are two different fill zones in the dam including a cut off wall. Top width of the dam is 20 feet. The upstream and downstream embankments are on a 3 horizontal to 1 vertical slope. Appurtenant structures consist of a principal spillway, plunge pool stilling basin, emergency spillway, and a 24 inch gated pond drain pipe. The principal spillway has two inlets, a low stage orifice and a high stage covered top spillway. The inlets discharge through the riser to a 3.0 foot diameter concrete pipe. The dam construction was completed in November 1975. Plans, design calculations and construction data were prepared by the Soil Conservation Service and are available for inspection.

The visual inspection revealed that the dam is in excellent condition. The items noted in this report do not warrant a reduction in the assessed condition of the dam. The visual inspection revealed staining of the concrete on the riser structure, log debris along the reservoir banks and a fallen tree in the channel downstream of the dam.

Based on the intermediate size of the dam and its high hazard classification and in accordance with Corps of Engineers guidelines, the test flood inflow is equal to the Probable Maximum Flood (PMF) or 8000 cfs. The routed test flood outflow of 5760 cfs overtops the dam by 1.2 feet. With the water level at the top of dam, the spillways will pass 33 percent of the routed test flood outflow. As there is a high hazard to loss of life from large flows downstream of the dam, a review using ½ the PMF was made. The analysis indicates that the ½ PMF inflow would be 4000 cfs. As the maximum capacity of the spillway is 1900 cfs the dam will

not be overtopped. Hydraulic design calculations indicate that the principal spillway was designed to retard flows for up to a 100 year frequency flood. The crest elevation of the dam was designed using a total watershed runoff of 6.81 inches.

There are no recommendations resulting from the Phase I Inspection. Remedial measures include development of a downstream warning system in the event of emergency conditions, the removal of log debris from the reservoir banks, and the removal of a fallen tree in the downstream channel.

The remedial measures are described in Section 7 and, unless otherwise noted, should be addressed within two years after receipt of this Phase I Inspection Report by the owner.

Gordon H. Slaney, Jr.

Gordon H. Slaney, Jr., P.E.
Project Engineer

Howard, Needles, Tammen & Bergendoff
Boston, Massachusetts

This Phase I Inspection Report on Baker Floodwater Reservoir Site 6A has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.

Joseph W. Finegan

JOSEPH W. FINEGAN, JR., MEMBER
Water Control Branch
Engineering Division

Carney M. Terzian

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

Joseph A. McElroy

JOSEPH A. MCELROY, CHAIRMAN
Chief, NED Materials Testing Lab.
Foundations & Materials Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there by any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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SECTION 5
HYDROLOGY AND HYDRAULIC ANALYSIS

5.1 Evaluation of Features

a. General. Baker Dam Site 6A is an earthen embankment dam 730 feet long with a hydraulic height of 60 feet. The dam is constructed with two fill zones and an earth fill core which extends to bedrock over a portion of the length of the dam. Appurtenant works consist of a two stage riser and a 3 foot diameter concrete pipe which discharges to a plunge pool type stilling basin, an emergency spillway 80 feet wide and a 24 inch diameter gated pond drain pipe.

The dam is used for floodwater control and recreation. The dam is classified as intermediate in size having a height of 60 feet and maximum storage of 1209 acre-feet.

b. Design Data. According to the Soil Conservation Service design data this dam is constructed to retard flood flows of up to a 100 year frequency storm without utilizing the emergency spillway. The design flood control elevation is 970.8 feet or 0.2 feet below the emergency spillway crest. Total runoff for this condition is 3.30 inches during a six hour Type IIB storm. The crest of the dam was designed using a total watershed runoff of 6.81 inches. The structure is classified as having a "B" hazard, which is defined as "being located in a predominantly rural or agricultural area, where failure may cause damage to isolated homes, main highways or major railroads or cause interruption of use or service or relatively important utilities.

c. Experience Data. There are no records available of maximum discharge at the dam site. However during the inspection of the dam on May 17, 1979 it was noted that debris on the face of the dam reached to about elevation 967.0 which would correspond to a discharge of about 220 cfs.

d. Visual Observations. No evidence of damage to any portion of the project from overtopping was visible at the time of inspection.

e. Test Flood Analysis. Even though detailed design and operational data are available for this dam a hydrologic evaluation was performed using a test flood equal to the Probable Maximum Flood (PMF) as determined from Guide Curves issued by the Corps of Engineers. Based on a drainage area of 3.38 square miles, it was estimated that the test flood inflow at Baker Dam Site 6A would be 8000 cfs. Following

SECTION 4
OPERATIONAL PROCEDURES

4.1 Procedure

Baker Dam Site 6A is used for floodwater control and recreation. Under normal operating procedures the dam is left to function as designed. The recreation pool level is maintained by the low stage orifice opening in the riser. Flood events of up to a 100 year frequency are retarded by the reservoir storage between the recreation pool and the emergency spillway crest. The emergency spillway is utilized only with events greater than a 100 year frequency.

4.2 Maintenance of Dam

The dam is inspected on an annual basis by the New Hampshire Water Resources Board and the Soil Conservation Service. Maintenance is undertaken as a result of the inspection on an as needed basis. The dam is visited on a monthly basis by personnel of the Water Resources Board.

4.3 Maintenance of Operating Facilities

Maintenance of the outlet works is performed as in Section 4.2.

4.4 Description of Warning Systems

There are no warning systems in effect for this facility.

4.5 Evaluation

The current operation and maintenance procedure for this facility appear to be adequate to insure that any problems encountered can be remedied within a reasonable period of time. However, the owner should establish a downstream warning system to follow in the event of emergency conditions.

The pond drain structure consists of an inlet structure and a 24 inch diameter reinforced concrete pipe. The 24 inch pond pipe is extended to the riser structure and is controlled by a mechanically operated gate. The pond drain structure and control gate were under water at the time of inspection. The gate and control mechanism are housed in the concrete riser tower. The operating mechanism appeared to be in good condition.

The outlet works conduit consists of 36 inch diameter reinforced concrete pipe and is placed on a concrete bedding. The pipe and the bedding are in good condition as shown in Photos No. 12 & 13.

Visual inspection of outlet works discharge channel and plunge pool stilling basin showed it to be in excellent condition.

The discharge channel shown in Photo No. 12 is unobstructed to the limits of the project. The rip-rap along the channel is in excellent condition.

d. Reservoir Area. The reservoir is surrounded by wooded terrain. The left bank of the pool is grass covered. There are no cottages or dwellings along the shorline. Log debris was noted on the right bank and a small portion of the left bank of the reservoir. Some log debris was on the face of the dam.

e. Downstream Channel. For a distance of about 200 feet downstream of the dam the channel is lined with rip-rap with grassed banks. The channel enters a wooded area with trees on both banks. There is a fallen tree across the channel located just into the wood line.

3.2 Evaluation

Visual examination indicates the dam is in excellent condition. Visual examination revealed the following:

(a) Staining of concrete on the riser structure

(b) Log debris along the reservoir banks

(c) A fallen tree across the downstream channel

Crest

The crest of the dam is 20 feet wide and has an excellent grass cover, as shown in Photo No. 2.

No misalignment of the crest was observed.

Downstream Slope

The downstream slope is 2.5 horizontal to 1 vertical and has an excellent grass cover, as shown in Photo No. 7. The contact between the downstream slope and the abutments has been paved with riprap to prevent erosion. This riprap is in excellent condition.

No seepage or damp areas were observed on the downstream slope or below the toe of the dam.

The dam has a trench drain near the downstream toe which is piped to the outlet stilling basin. A small amount of water was flowing from the 12 inch diameter drainpipe exiting on the left side of the outlet pipe. The foundation drainpipes are shown in Photo No. 13.

c. Appurtenant Structures. Visual inspection of the concrete riser principal spillway structure, auxiliary earth spillway and outlet works structure did not reveal any evidence of stability problems. The concrete surface and vertical alignment of the riser structure are in good condition except for minor rust staining. The spillway trash rack and service ladder are also in good condition. Some rust was noted around the manhole cover plate.

The concrete riser principal structure consists of three elements, an overflow control (low and high stages of spillway), a vertical transition and closed concrete discharge conduit. The riser structure is placed in the earth embankment. Visual inspection revealed that the riser structure appeared to be in good sound condition, Photos No. 9,10 & 11.

The galvanized trash racks at the low and high stages of flow control consist of standard shape angles and grating. Both trash rack assemblies are in good condition, no rust or peeling of the protective coating was noted.

The emergency earth spillway, Photos No. 15,16 & 17 is a grassy channel reinforced with riprap or rock, and is located in left abutment. The emergency spillway leads to the downstream channel of Tural Brook. The downstream channel has steep embankments on both sides. The channel is heavily wooded. The emergency spillway is in excellent condition.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General. The field inspection of Baker Dam Site 6A was made on May 17, 1979. The inspection team consisted of personnel from Howard, Needles, Tammen & Bergendoff and Geotechnical Engineers, Inc. A representative of the New Hampshire Water Resources Board was also present during the inspection. Inspection checklists, completed during the inspection, are included in Appendix A. At the time of inspection the water level was approximately 1.0 foot above the invert of the low stage inlet. The upstream face of the dam could only be inspected above this water level.

b. Dam. Visual inspection of the dam indicated that it is in excellent condition.

The dam is an earth embankment about 730 feet long and 60 feet high. The embankment consists of two zones, a wide upstream zone of silty sand and gravel and a downstream shell of sandy gravel. A cutoff trench extends below the center of the dam into bedrock or on impervious silty till. A drainage trench extends below the downstream shell at the base and the abutments of the dam.

An unpaved emergency spillway is cut into the left abutment passing around the embankment. An outlet works consisting of a concrete riser, 36-inch diameter concrete pipe passing through the dam, and a rip-rap lined stilling basin is located approximately on the center of the dam.

Upstream Slope

The upstream slope is 3 horizontal to 1 vertical and has a 9-foot wide berm at about mid-height. The crest elevation is 975.1 feet and between elevations 964.7 and 949.1, the slope is covered with riprap.

At the time of inspection, the pool was at about elevation 953, allowing the upper 10 feet of riprap to be inspected. The condition of the riprap is excellent. Photos No. 1 & 6 show the riprap.

The embankment slope above the riprap to the crest of the dam has an excellent grass cover, as shown in Photo No. 5.

SECTION 2
ENGINEERING DATA

2.1 Design

A complete set of design data including layout, hydraulic design, foundation and embankment design, geology and soils reports, structural design, quanities and specifications are available for Baker Dam Site 6A. In addition, there are construction drawings available. Design of the dam was done by the Soil Conservation Service, Durham, New Hampshire.

2.2 Construction

The dam construction was completed in November of 1975. A complete record of construction documents were made available. These documents include: as-built plans, job diarys, surveying records, test drilling logs, compaction test results, concrete tests and certificate of completion. Construction was by Robie Construction Co., Inc. and was inspected by the Soil Conservation Service, Durham, New Hampshire.

2.3 Operation

Normally the pond drain line gate is closed. The recreational level of 954 is maintained by the low stage orifice openings. The principal spillway riser and reservoir storage is designed to retard runoff from up to a 100 year frequency storm without discharge occuring in the emergency spillway (crest 971.0).

2.4 Evaluation

a. Availability. Engineering data available for Baker Dam Site 6A consists of the information outlined in Sections 2.1 and 2.2. The plans, design data, and construction records are available at the offices of the Soil Conservation Service, Federal Building, Durham, New Hampshire, 03824.

b. Adequacy. A complete set of design and construction data did allow for a definative review within the confines of this Phase I - Inspection Report. Therefore, the adequacy of this dam is based on the design and construction data reviewed, visual inspection, past performance history and sound engineering judgement.

c. Validity. The field inspection indicated that the external features of Baker Dam Site 6A substantially agree with those shown on the available plans.

Emergency Spillway

(1) Type - earth

(2) Length of weir - 80 feet wide

(3) Crest Elevation - 971.0

(4) Gates - none

(5) U/S Channel - Approach channel from reservoir is 80 feet wide with 2½ to 1 side slopes

(6) Downstream Channel - Below the outlet structure for a distance of 200 feet the channel has grass lined banks, and a rip-rapped channel. Downstream of this section the channel enters a wooded area.

j. Regulating Outlets. The recreation level of the reservoir is controlled by a 27 inch by 20 inch orifice inlet set in the riser at invert elevation 954.1. There is a trash rack for the opening but no control gate . The 24 inch pond drain pipe set at invert 917.0 extends 126 feet into the reservoir from the riser, and has a trash rack at the intake. The pipe is controlled at the riser by a 24 inch gate/valve.

f. Reservoir Surface (acres)

(1) Recreation Pool - 28

(2) Flood Control Pool - 50.7

(3) Spillway Crest - 51.5

(4) Test Flood Pool - 56.8

(5) Top Dam - 56.8

g. Dam

(1) Type - earth

(2) Length - 730 feet

(3) Height - 60 feet hydraulic
65 feet structural

(4) Top Width - 20 feet

(5) Side Slopes - upstream 3 horizontal to 1 vertical,
downstream 2½:1

(6) Zoning - 2 fill zones

(7) Impervious core - none

(8) Cutoff - zone 1 fill

(9) Grout Curtain - none

(10) Other - none

h. Diversion and Regulating Tunnel

See Section j

i. Principal Spillway

(1) Type - concrete riser, covered top - 3 foot diameter discharge
discharge pipe through dam.

(2) Length of weir - total 18 feet

(3) Crest Elevation - 964.7

(4) Gates - none

(5) U/S Channel - none

(2) There are no records available of maximum discharge at the site. However, during the inspection of the dam on May 17, 1979 it was noted that debris on the face of the dam reached to about elevation 967.0 which would correspond to a discharge of about 220 cfs.

(3) The emergency spillway and riser capacity with the water surface at the top of the dam is approximately 1900 cfs at elevation 975.1.

(4) Emergency spillway and riser capacity with the water surface elevation at the test flood elevation of 976.3 is approximately 2790 cfs.

(5) The total project discharge at the test flood elevation of 976.3 is 5760 cfs.

c. Elevation (feet above MSL)

(1) Streambed at centerline of dam - 915.

(2) Maximum tailwater - unknown

(3) Upstream portal invert pond drain - 917.0

(4) Recreation pool - 954.1

(5) Full flood control pool - 970.79

(6) Spillway crest (riser crest) - 964.7
(emergency spillway) - 971.0

(7) Design surcharge - 970.79

(8) Top Dam - 975.1

(9) Test Flood Surcharge - 976.3

d. Reservoir (miles)

(1) Length of Maximum Pool - .94

(2) Length of Recreational Pool - .60

(3) Length of Flood Control Pool - .38

e. Storage (gross acre-feet)

(1) Recreation Pool - 326

(2) Flood Control Pool - 960

(3) Spillway Crest Pool - 981

(4) Top of Dam - 1209

g. Purpose of Dam. This dam is used for both floodwater control and recreation. The recreational pool is maintained by the low stage intake in the riser. The storage between the low stage outlet and the emergency spillway crest is used for floodwater control.

h. Design and Construction History. The construction of this dam was completed in November of 1975. Design and construction inspection of this dam were done by the Soil Conservation Service, Durham, New Hampshire. The construction contractor was Robie Construction Company, Inc.

i. Normal Operating Procedures. The recreational pool is maintained by the low stage inlet on the riser. Under flood conditions, when the capacity of the low stage orifice is exceeded, the storage is utilized. The high stage outlet will reach maximum design discharge before the reservoir reaches the crest of the emergency spillway. The dam does not require any manual operation in order to function.

1.3 Pertinent Data

a. Drainage Area. The area tributary to Baker Site 6A consists of 3.35 square miles of mountainous terrain. There is no development in the watershed except for a camp ground. Maximum elevation is at about 1880 feet MSL, and reservoir full elevation is at 975 feet MSL.

The area around the reservoir is mostly wooded. There are no cottages or dwellings along the shoreline. A roadway divides the reservoir area with a 6 foot diameter culvert connecting the upper and lower areas of the reservoir.

b. Discharge of Dam Site

(1) Outlet works for Baker Dam Site 6A consist of an emergency spillway, a riser with a low stage orifice and a high stage covered top spillway, and a 24 inch pond drain pipe controlled by a gate. Invert of the pond drain is at 917.0 MSL. Maximum discharge of the pipe when the reservoir is at the recreational pool level of 954.1 is about 105 cfs. The low stage orifice has one opening 27 inches by 20 inches in size set at invert 954.1. Capacity of the low stage inlet when the reservoir is at the crest of the high stage inlet (964.7 ft) is 58 cfs. The high stage covered inlet crest set at elevation 964.7 has a capacity of 229 cfs when the water level is at the emergency spillway crest of 971.0. The 80 foot wide emergency spillway has a crest at elevation 971.0. When the water surface is at the top of dam (elevation 975.1) the emergency spillway will have a capacity of 1663 cfs.

b. Description of Dam and Appurtenances. Baker Site 6A Dam is an earthen embankment structure. Total length of the dam, according to existing drawings, is 730 feet. Maximum structural height is 65 feet, and the height from top of dam to the streambed is 60 feet. According to the plans there are two different fill zones in the structure, which include a cut off wall. Approximately 56 percent of the length of the cut off wall extends to bedrock. Top width of the dam is 20 feet and the embankment is on a 3 horizontal to 1 vertical slope both up and downstream.

Appurtenant structures consist of a concrete riser and pipe, principal spillway with a covered top inlet. There are two stages to the inlet structure, a low stage orifice and a high stage covered inlet. The riser discharges through a 3 foot diameter concrete pipe to a plunge pool type stilling basin. The emergency spillway is located on the left side of the dam and has a width of 80 feet. It is an excavated earthen structure with a vegetative cover. A 24 inch diameter pond drain pipe can be opened from the riser structure by a 24 inch gate valve to lower the water level behind the dam.

Figures 1 and 2, located in Appendix B, show a plan of the dam and appurtenant structures. Photographs of each structure are shown in Appendix C.

c. Size Classification. Intermediate (hydraulic height - 60 feet, storage - 1209 acre-feet) classification based on height being between 40 and 100 feet and storage being between 1000 acre-feet and 50,000 acre-feet as given in Recommended Guidelines for Safety Inspection of Dams.

d. Hazard Classification. The potential for hazard posed by this dam is classified as significant. Failure of this dam at maximum pool elevation (top of dam) would result in a flood wave about 24 feet high at the end of the reach studied, 1.4 miles downstream of the dam. One dwelling in the reach would be completely inundated and a camp ground and office building would be flooded.

e. Ownership. This dam is owned by the New Hampshire Water Resources Board, 37 Pleasant Street, Concord, New Hampshire.

f. Operator. This dam is maintained and operated by the New Hampshire Water Resources Board. Chairman of the Water Resources Board is Mr. George McGee, Sr.; Mr. Vernon Knowlton is Chief Engineer, Telephone No. 603/271-1110.

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT
BAKER FLOODWATER RESERVOIR SITE 6A

SECTION 1
PROJECT INFORMATION

1.1 General

a. Authority. Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Howard, Needles, Tammen & Bergendoff has been retained by the New England Division to inspect and report on selected dams in the State of New Hampshire Authorization and notice to proceed were issued to Howard, Needles, Tammen & Bergendoff under a letter of March 30, 1979 from John P. Chandler, Colonel, Corps of Engineers. Contract No. DACW33-79-C-0060 has been assigned by the Corps of Engineers for this work.

b. Purpose

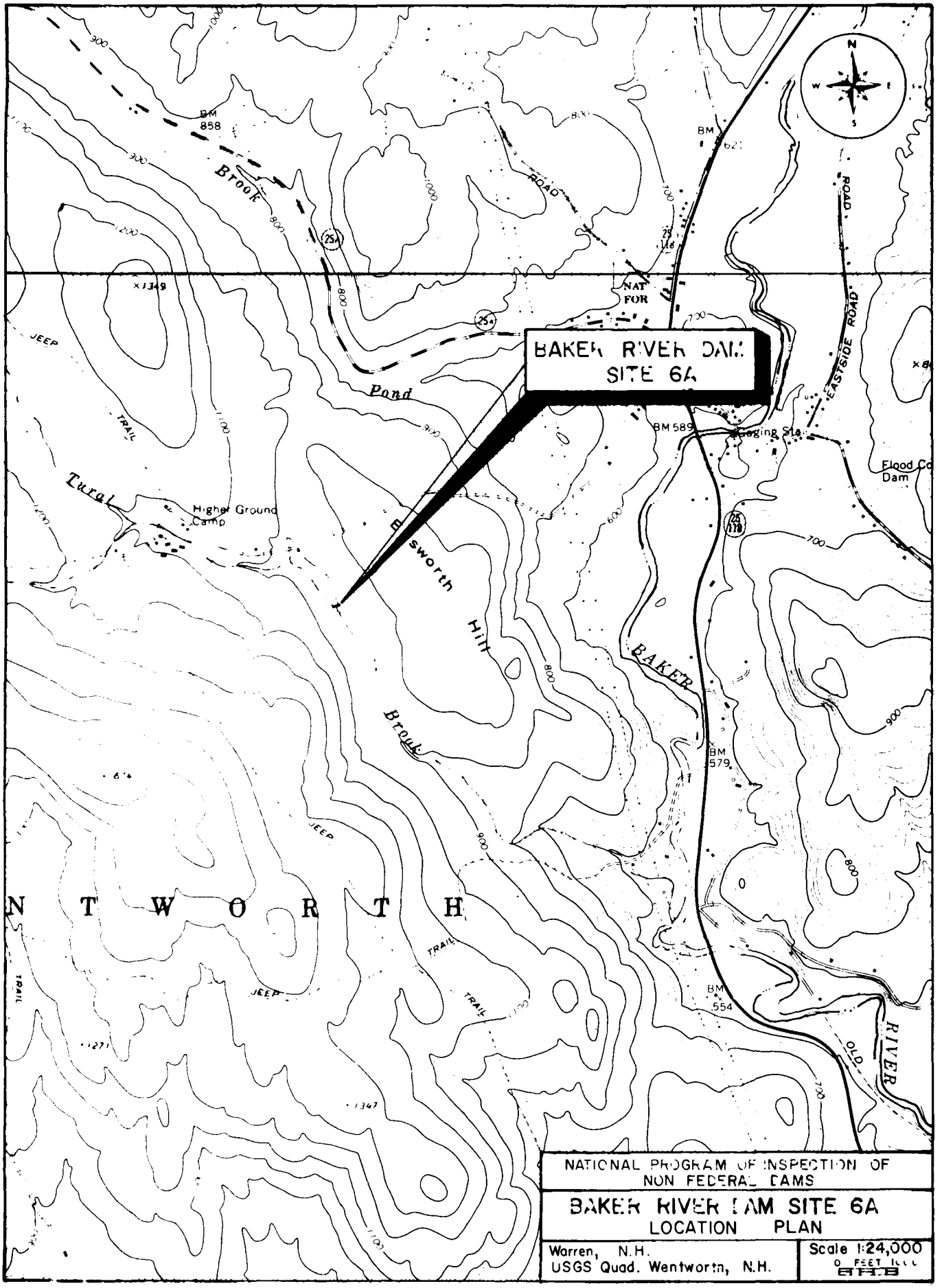
(1) To perform technical inspection and evaluation of non-Federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-Federal interests.

(2) To encourage and prepare the states to initiate quickly effective dam safety programs for non-Federal dams.

(3) To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location. Baker Floodwater Reservoir Site 6A (Baker Dam Site 6A), also known as Grover C. Breck Dam, is located on Tural Brook approximately 1.6 miles upstream of the confluence of Tural Brook and the Baker River in the Town of Wentworth, New Hampshire. The dam is shown on U.S.G.S. Quadrangle Wentworth, New Hampshire with approximate coordinates N43°51'15" W71°55'36", Grafton County, New Hampshire. The location of Baker Dam Site 6A is shown on the preceding page.



NATIONAL PROGRAM OF INSPECTION OF NON FEDERAL DAMS

BAKER RIVER DAM SITE 6A
LOCATION PLAN

Warren, N.H.
USGS Quad. Wentworth, N.H.

Scale 1:24,000
0 FEET 1000

the guidance for Estimating Effect of Surcharge Storage on Maximum Probable Discharge results in a routed test flood outflow of 5760 cfs. As the maximum capacity of the spillways at the top of dam is 1900 cfs (approximately 33 percent of the routed test flood outflow, the test flood will result in the dam being overtopped by approximately 1.2 feet. The test flood was routed starting at the recreation pool elevation. As there is a high hazard to life from large flows downstream of the dam (resulting from dam failure), and dam failure resulting from overtopping would significantly increase the hazard to loss of life downstream of the dam, a review using ½ the PMF was made. This analysis indicates that the test flood inflow would be 4000 cfs. As the total capacity of the spillways is 1900 cfs the dam will not be overtopped. There will be no freeboard as the spillways will be at maximum capacity.

f. Dam Failure Analysis. The impact of failure of the dam at maximum pool (top of dam) was assessed using the "Rule of Thumb" Guidance for Estimating Downstream Hazard Hydrographs issued by the Corps of Engineers. The analysis covered the reach extending from the dam to a point 1.4 miles downstream to the confluence of the Baker River and Tural Brook. Prior to breach of dam, downstream river stage would be about 5 feet with the spillway discharging at full capacity. Breach of dam with the water surface at the top of dam would result in a flood wave about 29 feet high. This stage would be reduced to about 24 feet at the end of the reach. One dwelling at the end of the reach would be totally inundated. A campground office building on high ground at about the same location would be flooded by about 4 feet of water. Several camp sites which would if occupied. be totally flooded.

SECTION 6
STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations. The visual inspection did not disclose any immediate stability problems.

b. Design and Construction Data. Design drawings and construction specifications exist and indicate the dam is a zoned embankment consisting of a wide upstream zone of silty sand and gravel and a downstream zone of sandy gravel. A cutoff trench extends below the central portion of the dam. The cutoff trench extends up both abutments. The upstream slope is 3 horizontal and 1 vertical and the downstream slope is 2.5 horizontal to 1 vertical.

A drainage trench is located beneath the downstream zone of the embankment.

A grass-covered emergency spillway passes around the embankment on the left abutment.

A review of the construction data available indicates that the dam and appurtenant structures were constructed according to the plans and specifications.

c. Operating Records. There are no operating records available for this facility.

d. Post-Construction Changes. There is no record of post-construction changes.

e. Seismic Stability. The dam is located in Seismic Zone 2 and in accordance with the recommended Phase I guidelines does not warrant seismic analysis.

SECTION 7
ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition. The visual inspection of Baker Floodwater Reservoir Site 6A indicates the dam is in excellent condition. The inspection revealed the items listed below, however, these items do not warrant reducing the assessed condition of the dam.

(1) Staining of concrete on the riser structure.

(2) Log debris along the reservoir banks.

(3) A fallen tree across the channel downstream of the dam.

The hydraulic analysis reveals that the spillways cannot pass the routed test flood without overtopping the dam.

b. Adequacy of Information. A complete set of design and construction data did allow for a definitive review with the confines of this Phase I - Inspection Report. Therefore, the adequacy of this dam is based on the design and construction data reviewed, visual inspection, past performance history and sound engineering judgement.

c. Urgency. This dam is in generally excellent condition. The remedial measures described in Section 7.3 should be, unless otherwise noted, be accomplished within (2) two years. The remedial measures described in Sections 7.3a and 7.3b should be done during the seasonal maintenance performed by the owner.

d. Necessity of Additional Investigation. No additional investigation is needed to complete the Phase I inspection.

7.2 Recommendations

There are no recommendations resulting from the Phase I Inspection.

7.3 Remedial Measures

(a) Remove the fallen tree from the downstream channel.

(b) Remove the log debris from the reservoir banks.

(c) Devise a downstream warning system to follow in the event of emergency conditions.

(d) Continue the periodic inspections on a biennial basis.

(e) Establish a system such that the reservoir level can be monitored during periods of intense rainfall.

7.4 Alternatives

There are no practical alternatives to the remedial measures described in Section 7.3.

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT SITE 6A, BAKER DAM

DATE May 17, 1979

TIME 2:30 PM

WEATHER Fair

W.S. ELEV. 955.1 U.S. - DN.S

PARTY:

1.	G. Slaney	HNTB	
2.	S. Mazur	HNTB	
3.	D. LaGatta	GEI	
4.	C. Osgood	GEI	
5.			
6.			
7.			
8.			
9.			
10.			

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Dam	D. LaGatta, C. Osgood	
2.	Spillway, Outlet Works	S. Mazur	
3.	and Downstream Channel	G. Slaney	
4.			
5.			
6.			
7.			
8.			
9.			
10.			

PERIODIC INSPECTION CHECK LIST

PROJECT BAKER SITE No. 6A DAM

DATE May 17, 1979

PROJECT FEATURE Earth Embankment

NAME D. P. LaGatta

DISCIPLINE Geotechnical Engineer

NAME C. E. Osgood

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation	975.1
Current Pool Elevation	955.1
Maximum Impoundment to Date	967.0 estimated from debris on dam
Surface Cracks	None
Pavement Condition	No pavement. Grass covered crest
Movement or Settlement of Crest	None apparent
Lateral Movement	None apparent
Vertical Alignment	No misalignment visible
Horizontal Alignment	No misalignment visible
Condition at Abutment and at Concrete Structures	Good condition
Indications of Movement of Structural Items on Slopes	No structural items on slopes
Trespassing on Slopes	No evidence of treaspassing
Sloughing or Erosion of Slopes or Abutments	None observed
Rock Slope Protection - Riprap Failures	Riprap in good condition
Unusual Movement or Cracking at or near Toes	None observed
Unusual Embankment or Downstream Seepage	None
Piping or Boils	Left and right drains clear, left drain has very small flow of water.
Foundation Drainage Features	None
Toe Drains	None
Instrumentation System	
Vegetation	Good grass cover.

PERIODIC INSPECTION CHECK LIST

PROJECT SITE 6A, BAKER DAM DATE May 17, 1979

PROJECT FEATURE Intake Channel/Structure NAME D. LaGatta

DISCIPLINE Geotechnical/Structural Engineers NAME S. Mazur

AREA EVALUATED	CONDITION
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
a. Approach Channel	No approach channel
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	None
Debris	Low trash rack at riser structure is filled with debris.
Condition of Concrete Lining	
Drains or Weep Holes	-
b. Intake Structure	
Condition of Concrete	Concrete of riser structure at low intake opening and high stage principal spillway openings are in good condition. Bottom water release structure was under water.
Stop Logs and Slots	

PERIODIC INSPECTION CHECK LIST

PROJECT SITE 6A, BAKER DAM DATE May 17, 1979

PROJECT FEATURE Control Tower NAME C. Slaney

DISCIPLINE Structural/Hydraulic Engineers NAME S. Mazur

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	
a. Concrete and Structural General Condition Condition of Joints Spalling Visible Reinforcing Rusting or Staining of Concrete Any Seepage or Efflorescence Joint Alignment Unusual Seepage or Leaks in Gate Chamber Cracks Rusting or Corrosion of Steel	Outlet works (bottom water release structure) consist of inlet structure and 24" I.D. reinforced concrete pipe extended to riser structure. Outlet works structure is controlled by mechanically operated gate. (from riser roof deck) Bottom water release structure was under water.
b. Mechanical and Electrical Air Vents Float Wells Crane Hoist Elevator Hydraulic System Service Gates Emergency Gates Lightning Protection System Emergency Power System Wiring and Lighting System	Mechanically operated gate and control mechanism are housed in concrete riser structure. Gate is operated from roof of riser structure. Gate and control mechanism appear to be in good operational condition.

PERIODIC INSPECTION CHECK LIST

PROJECT SITE 6A, BAKER DAM — DATE May 17, 1979

PROJECT FEATURE Spillway/Outlet Works Conduit — NAME S. Slaney

DISCIPLINE Structural/Hydraulic Engineers — NAME S. Mazur

AREA EVALUATED	CONDITION
OUTLET WORKS - TRANSITION AND CONDUIT	
General Condition of Concrete	At the time of inspection outlet conduits were under water. These structures were built in 1974 and are in good condition.
Rust or Staining on Concrete	
Spalling	
Erosion or Cavitation	Outlet works conduit (dam section) consists of 36" I.D. reinforced concrete pipe and is placed on concrete bedding.
Cracking	
Alignment of Monoliths	
Alignment of Joints	
Numbering of Monoliths	

PERIODIC INSPECTION CHECK LIST

PROJECT SITE 6A, BAKER DAM DATE May 17, 1979

PROJECT FEATURE Outlet Structure/Channel NAME D. LaCatta, C. Osgood

DISCIPLINE Structural/Hydraulic/Geotechnical Engineers NAME S. Mazur, G. Slaney

AREA EVALUATED	CONDITION
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	
General Condition of Concrete	Concrete outlet works pipe and concrete support bedding are in good condition.
Rust or Staining	Water staining on lower section of concrete pipe.
Spalling	None
Erosion or Cavitation	None
Visible Reinforcing	None
Any Seepage or Efflorescence	None observed
Condition at Joints	Good
Drain Holes	None
Channel	Rock bottom and gravel
Loose Rock or Trees Overhanging Channel	none
Condition of Discharge Channel	good, clear

PERIODIC INSPECTION CHECK LIST

PROJECT SITE 5A, BAKER DAM — DATE May 17, 1979

PROJECT FEATURE Outlet Works - Spillway — NAME D. LaGatta, C. Osgood

DISCIPLINE Structural/Hydraulic/Geotechnical — NAME S. Mazur, G. Slaney

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	
General Condition	Good
Loose Rock Overhanding Channel	None
Trees Overhanging Channel	None
Floor of Approach Channel	Good grass cover
b. Weir and Training Walls	This facility has two spillway structures; concrete riser or shaft spillway and emergency earth spillway located in left abutment. Both spillways are in good condition.
General Condition of Concrete	
Rust or Staining None	
Spalling	None
Any Visible Reinforcing	None
Any Seepage or Efflorescence	None
Drain Holes	
c. Discharge Channel	
General Channel Condition	Very good
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	None
Floor of Channel	Grass covered
Other Obstructions	None

PERIODIC INSPECTION CHECK LIST

PROJECT SITE 6A, BAKER DAM DATE May 17, 1979

PROJECT FEATURE NAME

DISCIPLINE NAME

AREA EVALUATED	CONDITION
OUTLET WORKS - SERVICE BRIDGE	
a. Super Structure	This facility has no service bridge.
Bearings	
Anchor Bolts	
Bridge Seat	
Longitudinal Members	
Under Side of Deck	
Secondary Bracing	
Deck	
Drainage System	
Railings	
Expansion Joints	
Paint	
b. Abutment & Piers	
General Condition of Concrete	
Alignment of Abutment	
Approach to Bridge	
Condition of Seat & Backwall	

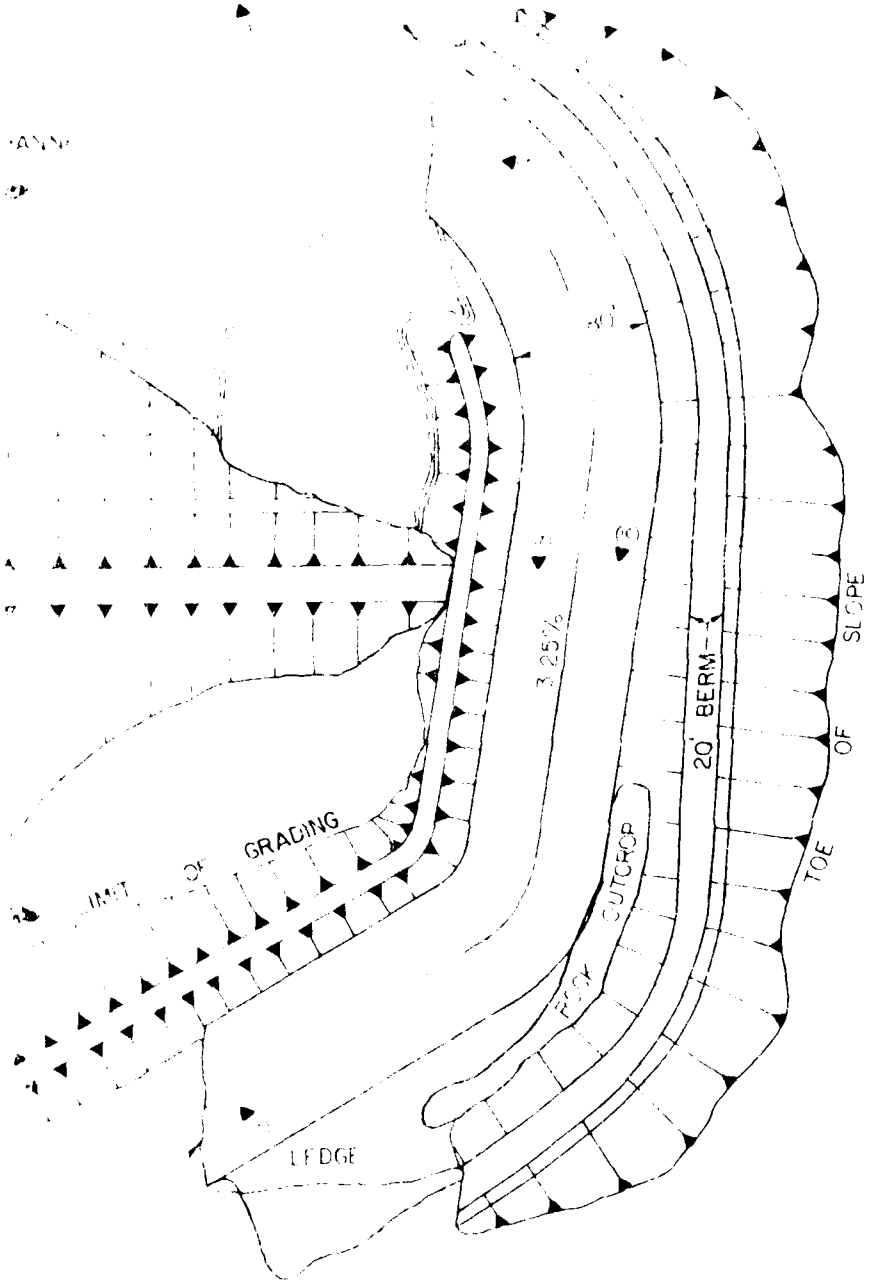
APPENDIX B

ENGINEERING DATA

1. LIST OF DESIGN, CONSTRUCTION AND MAINTENANCE RECORDS

2. PAST INSPECTION REPORTS

3. PLAN AND DETAILS



LEGEND

INDICATES LOCATION WHERE PHOTO WAS TAKEN AND DIRECTION

A

1. THE INFORMATION SHOWN ON THESE DRAWINGS IS BASED ON THE ORIGINAL CONSTRUCTION PLANS AND VISUAL OBSERVATIONS MADE DURING THE FIELD INSPECTION. DIMENSIONS OR MATERIALS INDICATED ON THESE DRAWINGS WHICH WERE BELOW GRADE OR WATER DURING THE TIME OF INSPECTION WERE NOT VERIFIED.

2. THE ELEVATIONS SHOWN ARE 1929 MSL DATUM

NATIONAL PROGRAM IN INSPECTION OF NON-FEDERAL DAMS

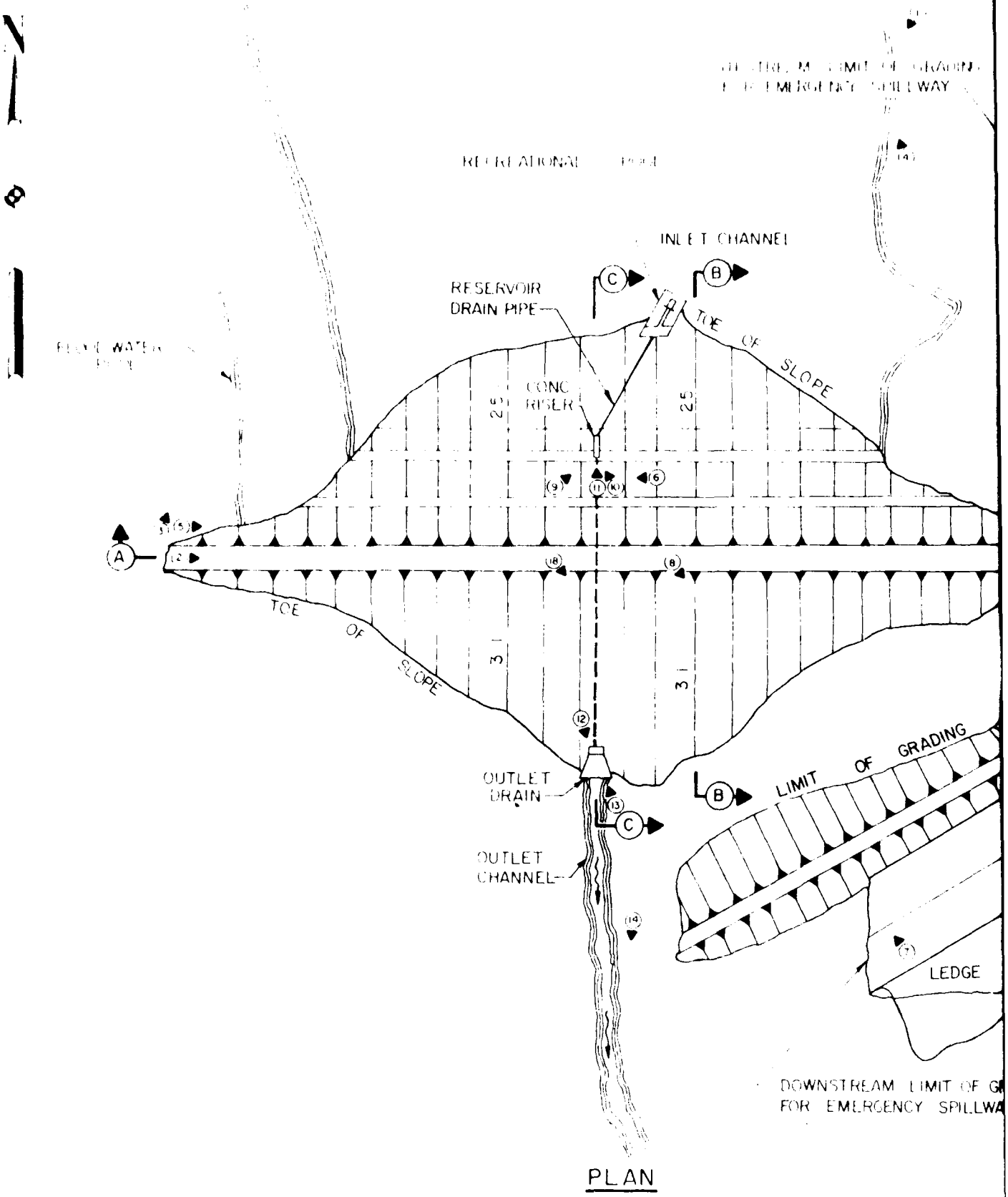
SITE NO. 6A

BAKER FLOODWATER

RURAL BROOK RESERVOIR WENTWORTH, N.H.

Figure 1 of 2

2 of 2



PLAN

1 of 2

IMPACT BASIN, SAF, BOX INLET, & MISCELLANEOUS CONCRETE STRUCTURES

(specify)_____ _____

N/A

Concrete: inside and out	Cracking___; Spalling___; Other deterioration ___; Excessive movement (check joints)___; Waterstops___; Joint sealant___; Other___.
Trashracks: low and high stage	Condition of protective coatings___; Corrosion ___; Damaged parts___; Condition of fastenings___; Need of gratings due to beaver___; Safety condition (protruding fastenings, sharp edges, etc.)___; Other___.
Gates: including lifting device, stem, guides, disc, flap	Condition of protective coating___; Corrosion ___; Damaged parts___; Condition of fastenings___; Stem alignment___; Operation___; Lubrication___; Wood decay___; Other___.
Structure Drainage:	Report under "Embankment and Other Drains"
Structure, Railing, Grates, Barriers, etc.	Condition of protective coating___; Corrosion ___; Damaged parts___; Condition of Fastenings___; Wood decay___; Safety condition (protruding fastenings, sharp edges, etc.) ____; Other___.
Safety Items:	Condition of warning signs___; Condition of safety equipment___; Other___.

COMMENTS_____

CHANNEL

Stream obstructions.	1
Debris in stream.	1
Sediment bars controlled.	1
Plunge pool stability.	1
Fish habitat appurtenances	N/A

Riprap -- Report under "Riprap" (Item 4)

COMMENTS_____

RISER

Caution Be extremely careful when using ladders. Check condition before using. Ladders are sometimes broken, loose, corroded, and or slippery.
Use safety harness.

Ladders:
inside and out

Condition of protective coating 1 ; Corrosion 1 ; Damaged parts 1 ; Loose ___; Other ___.

Concrete:
~~xxxxxxxx~~ out

Cracking 1 ; Spalling 1 ; Other deterioration 1 ; Excessive movement (check joint at riser and conduit) ___; Other ___.

Trashracks:
low and high stage

Condition of protective coatings 1 ; Corrosion 1 ; Damaged parts 1 ; Condition of fastenings ___; Need of gratings due to beaver ___; Safety condition (protruding fastenings, sharp edges, etc.) ___; Other ___.

Manhole:

Condition of protective coatings 1 ; Corrosion 1 ; Damage 1 ; Lock operable 1 ; Other ___.

Gate: 1/
including lifting device, stem, guides, disc

Condition of protective coating ___; Corrosion ___; Damaged parts ___; Condition of fastenings ___; Stem alignment ___; Lubrication ___; Operation ___; Other ___.

Safety Items:

Condition of warning signs ___; Condition of safety equipment ___; Other ___.

COMMENTS 1/ Gate adjusted by Rodney Hunt representatives on 6/14/78. Reduced leakage. Adjusted stop nut and wedges.

VEGETATION

	Dam	Emergency Spillways left	Emergency Spillways right 1/	Dike	Outlet Channel	Water way	Other (_____)
Condition of stand (including need for lime and fertilizer)	—	—	—	—	—	—	—
Undesirable vegetation	—	1	1	—	—	—	—
Drainage (surface)	—	—	—	—	—	—	—
Erosion 2/	—	—	—	—	—	—	—
Sedimentation	—	—	—	—	—	—	—
Condition of planting	—	—	—	—	—	—	—
Pest control	—	—	—	—	—	—	—
Fire control	—	—	—	—	—	—	—

COMMENTS Vegetation looks good. Topdressing worked well, one area on downstream face of dam did not get topdressed. New planted trees and shrubs not evident.

EMBANKMENT, STRUCTURAL, & OTHER DRAINS

		Dam left	Dam right 1/	Other (____)	Other (____)
Depth of Flow (in inches above invert)	With any obstruction	1"	[illegible] 3/	—	—
	Without any obstruction	—	—	—	—
Turbidity of Discharge (yes, no)	With any obstruction	—	—	—	—
	Without any obstruction	no	no	—	—
Condition of Protective Coating	Outside	1	1	—	—
	Inside	1	1	—	—
Obstruction in Flow (yes, no)		no	no	—	—
Animal Guard Condition		1	1	—	—
Outlet Condition		1	1	—	—

Retarding Pool Elevation (ft. msl)_____ or ≃ 1 (ft.) above below orifice
(rating stream level)

Other_____

COMMENTS 3/ a little out of drainfill below p'r.

1/ [illegible]

2/ [illegible], surface, stream, manmade, and livestock erosion.

EMBANKMENT AND EXCAVATED SLOPES

(Report riprap and vegetation and erosion condition under Items 4 and 5.)

	Dam	ES Dikes	Emergency Spillways left	Emergency Spillways right 1/	Other (____)	Other (____)
Sliding or sloughing	1	1	1	___	___	___
Holes (rodent and other) (check especially at embankments)	1	1	1	___	___	___
Excessive settlement (embankments)	1	1	1	___	___	___
Cracks						
Traverse	1	1	1	___	___	___
Longitudinal	1	1	1	___	___	___
Seepage 2/	1	1	1	___	___	___
Piping 2/	1	1	1	___	___	___

COMMENTS _____

RIPRAP

	Displ. of Rock	Loss of Spalls	Loss of Bedding	Erosion of Found.	Breakdown of Rock
Dam					
Upstream berm	1	1	1	1	1
Principal Spillway Outlet	___	___	___	___	___
Embankment Cutters					
left	1	1	1	1	1
right	1	1	1	1	1
Emergency Spillway					
location all	1	1	1	1	1
location ____	___	___	___	___	___
Waterways					
location at top of ES	1	1	1	1	1
location ____	___	___	___	___	___
Outlet Channel	___	___	___	___	___
Other ____	___	___	___	___	___

COMMENTS _____

1/Looking downstream.
2/Check [illegible] at downstream face of embankments

MAINTENANCE CHECKLIST FOR PL 566 FLOOD CONTROL STRUCTURES

This maintenance checklist is a guide for determining the maintenance required for Public Law 566 flood control structures in New Hampshire. It doesn't take the place of experience and judgment and is not inclusive. Items of a difficult nature to check, such as principal spillway conduit condition, are not included. Intensive checks of these items are necessary at proper intervals. Review of As Built drawings, the design folder, structure history, and previous maintenance reports should be part of the inspection. Prompt maintenance is a vital part of safe and effective operation.

Except where otherwise indicated, completion of this form may be facilitated by ranking maintenance items on a 1 to 4 basis where

1 = satisfactory
2 = satisfactory, but check carefully at next inspection
3 = requires maintenance this season
4 = requires immediate attention.

2 49 1-5

WATERSHED Baker SITE 6A DATE 6-13 & 14-78

INSPECTED BY: 6/13- [illegible] Kerr, [illegible] Milliken (O'BRIEN); Mr. Daniels, Nick Luhtala, Ray [illegible] Denninger (SCS); 6/14-Nick Luhtala, Ray Denninger (SCS)

1. ACCESS

Item	Rating
Access Road	2
Site Parking	N/A
Traffic Conditions	1
Vandalism Control	1
Trash Control	1

COMMENTS [illegible] road ditch filled with sediment.

2. RESERVOIR

Item	Rating
Timber stand at reservoir	1
Debris and slash	4 ✓
Sediment level in relation to low stage inlet	1

COMMENTS Road culvert plugged by beaver dam. Needs to be removed as soon as possible. Water could be unevenly distributed in the reservoir.

SOIL CONSERVATION SERVICE
U.S. DEPARTMENT OF AGRICULTURE

IMPACT BASIN, SAF, BOX INLET, & MISCELLANEOUS CONCRETE STRUCTURES

(specify)_____ _____

Concrete: inside and out	Cracking___; Spalling___; Other deterioration ___; Excessive movement (check joints)___; Waterstops___; Joint sealant___; Other___.
Trashracks: low and high stage	Condition of protective coatings___; Corrosion ___; Damaged parts___; Condition of fastenings___; Need of gratings due to beaver___; Safety condition (protruding fastenings, sharp edges, etc.)___; Other___.
Gates: including lifting device, stem, guides, disc, flap	Condition of protective coating___; Corrosion ___; Damaged parts___; Condition of fastenings___; Stem alignment___; Operation___; Lubrication___; Wood decay___; Other___.
Structure Drainage:	Report under "Embankment and Other Drains"
Structure, Railing, Grates, Barriers, etc.	Condition of protective coating___; Corrosion ___; Damaged parts___; Condition of Fastenings___; Wood decay___; Safety condition (protruding fastenings, sharp edges, etc.) ____; Other___.
Safety Items:	Condition of warning signs___; Condition of safety equipment___; Other___.

COMMENTS_____

_____

_____

_____

_____

_____

9. CHANNEL

Stream obstructions. . . . . /
Debris in stream. . . . . /
Sediment bars controlled. . . . . /
Plunge pool stability. . . . . /
Fish habitat appurtenances . . . . . —
Riprap -- Report under "Riprap" (item 4)

COMMENTS_____

_____

_____

_____

_____

_____

7 RISER

Caution Be extremely careful when using ladders. Check condition before using. Ladders are sometimes broken, loose, corroded, and or slippery.
Use safety harness.

Ladders:
inside and out — Condition of protective coating___; Corrosion___; Damaged parts___; Loose___; Other___.

Concrete:
inside and out — Cracking___; Spalling___; Other deterioration ___; Excessive movement (check joint at riser and conduit)___; Other___.

Trashracks:
low and high stage — Condition of protective coatings___; Corrosion ___; Damaged parts___; Condition of fastenings ___; Need of gratings due to beaver___; Safety condition (protruding fastenings, sharp edges, etc.)___; Other___.

Manhole: — Condition of protective coatings___; Corrosion ___; Damage___; Lock operable___; Other___.

Gate:
including lifting device, stem, guides, disc — Condition of protective coating___; Corrosion ___; Damaged parts___; Condition of fastenings___; Stem alignment___; Lubrication___; Operation___; Other___.

Safety Items: — Condition of warning signs___; Condition of safety equipment___; Other___.

COMMENTS WRB PERSONNEL WILL CHECK RISER & REPAIR-
TRAILERS LATER.

Vegetation

	Dam	Emergency Spillways left	Emergency Spillways right 1/	Dike	Outlet Channel	Water way	Other (Roadw
Condition of stand (including need for lime and fertilizer)	2	2	—	—	NA	—	—
Undesirable vegetation	1	1	—	—	1	—	1
Drainage (surface)	NA	1	—	—	NA	—	1
Erosion 2/	1	2	—	—	1	—	1
Sedimentation	1	1	—	—	1	—	1
Condition of planting	NA	2	—	—	NA	—	2
Pest control	—	—	—	—	—	—	—
Fire control	—	—	—	—	—	—	—

COMMENTS SPILLWAY SLOPES VERY DRY. UPSTREAM FACE OF DAM VERY DRY. SHRUBS & TREES BEING PLANTED

TOTAL ESTABLISHMENT PERIOD ENDS NOV. 77

6. EMBANKMENT, STRUCTURAL, & OTHER DRAINS

		Dam left	Dam right 1/	Other (____)	Other (____)
Depth of Flow (in inches above invert)	With any obstruction	N/A		—	—
	Without any obstruction	—	N/A	—	—
Turbidity of Discharge (yes, no)	With any obstruction	NO	—	—	—
	Without any obstruction	—	NO	—	—
Condition of Protective Coating	Outside	1	1	—	—
	Inside	1	1	—	—
Obstruction in Flow (yes, no)		YES	NO	—	—
Animal Guard Condition		1	1	—	—
Outlet Condition		1	1	—	—

Retarding Pool Elevation (ft. msl)_____ or_____(ft.) above / below _____

Other_____

COMMENTS SMALL AMOUNT OF DEBRIS IN ST. PIPE

1/Looking downstream.
2/Including: wave, surface, stream, manmade, and livestock erosion.

EMBANKMENT AND EXCAVATED SLOPES

(Report riprap and vegetation and erosion condition under Items 4 and 5.)

	Dam	Dike	Emergency Spillways 1/ left	Emergency Spillways 1/ right	Other ( )	Other ( )
Sliding or sloughing	1		3			
Holes (rodent and other) (check especially at embankments)	1		1			
Excessive settlement (embankments)	1		1			
Cracks						
Traverse	1		1			
Longitudinal	1		1			
Seepage 2/	1		2			
Piping 2/	1		1			

COMMENTS *SLIDING OR SLOUGHING HAS OCCURRED AT NUMEROUS LOCATIONS OF WHICH 7 ARE SIGNIFICANT, SIX OF THESE HAVE DEPOSITED MATERIAL IN THE EM. SPILLWAY BERM. THE SEVENTH IS LOCATED BETWEEN THE BERM AND THE SPILLWAY FLOOR*

RIPRAP

	Displ. of Rock	Loss of Spalls	Loss of Bedding	Erosion of Found.	Break-down of Rock
Dam					
Upstream berm	1	1	1	1	1
Principal Spillway Outlet	1	1	1	1	1
Embankment Gutters					
left *DOWNSTM*	1	1	1	1	1
right *UPSTM* *DOWNSTM*	1	1	1	1	1
Emergency Spillway					
location *BERM CUT SLOPE*	1	1	1	1	1
location *DIKE RT SIDE*	1	1	1	1	1
Waterways					
location *EM. SP. RT SIDE*	1	1	1	1	1
location					
Outlet Channel	1	1	1	1	1
Other *ROAD*					

COMMENTS *IT APPEARS THAT THE PLUNGE POOL IS PARTIALLY FILLED W/ SAND GRAVEL & SMALL ROCK. WATER RESOURCES BOARD PERSONNEL WILL CHECK RIPRAP ON ROAD*

1/ Looking downstream.
2/ Check especially at downstream face of embankments.

MAINTENANCE CHECKLIST FOR PL 566 FLOOD CONTROL STRUCTURES

This maintenance checklist is a guide for determining the maintenance required for Public Law 566 flood control structures in New Hampshire. It doesn't take the place of experience and judgment and is not inclusive. Items of a difficult nature to check, such as principal spillway conduit condition, are not included. Intensive checks of these items are necessary at proper intervals. Review of as built drawings, the design folder, structure history, and previous maintenance reports should be part of the inspection. Prompt maintenance is a vital part of safe and effective operation.

Except where otherwise indicated, completion of this form may be facilitated by ranking maintenance items on a 1 to 4 basis where

- 1 = satisfactory
- 2 = satisfactory, but check carefully at next inspection
- 3 = requires maintenance this season
- 4 = requires immediate attention.

WATERSHED *SUGAR RIVER* SITE *6A* DATE *5-20-77*

INSPECTED BY *KERR MILLIGEN* *DANNEHY KELSEY* *LUHTALA MCPHERSON*

1. GENERAL ITEMS

Access Road.	2
Site Fencing.	1
Traffic Conditions.	1
Vandalism Control.	1
Trash Control.	2

COMMENTS *SOME RUTTING OF ACCESS ROAD. TRASH ON DAM & IN U.S. TRASH RACK SHOULD BE REMOVED*

2. RESERVOIR

Timber stand at reservoir.	2
Debris and slash.	2
Sediment level in relation to low stage inlet	

COMMENTS *THERE ARE SOME BLOW DOWNS VISIBLE, THESE SHOULD BE WATCHED.*

SOIL CONSERVATION SERVICE
U.S. DEPARTMENT OF AGRICULTURE

PAST INSPECTION REPORTS

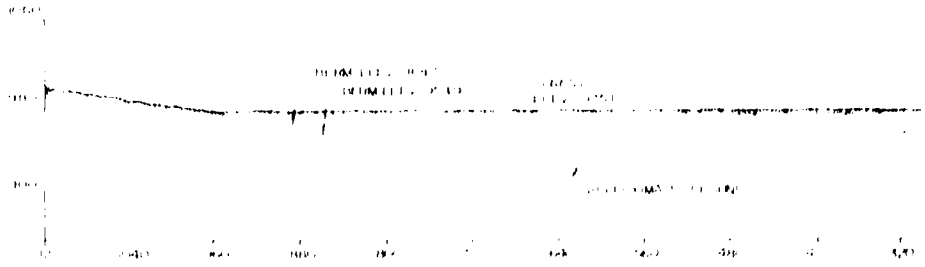
AVAILABLE ENGINEERING DATA

1. A set of drawings (33 sheets), dated August 1973, showing plans and details of the dam and appurtenant structures.

2. Design Data: including layout, hydraulic design, geology and soils reports, structural design, quanities and specifications.

3. Construction Data: including as-built plans, job diarys, surveying records, test drilling logs, compaction test results, concrete tests, and certificate of completion.

All of the above are on file with the U.S.D.A. Soil Conservation Service, Federal Building, Durham, N.H. 03824.



SECTION A-A

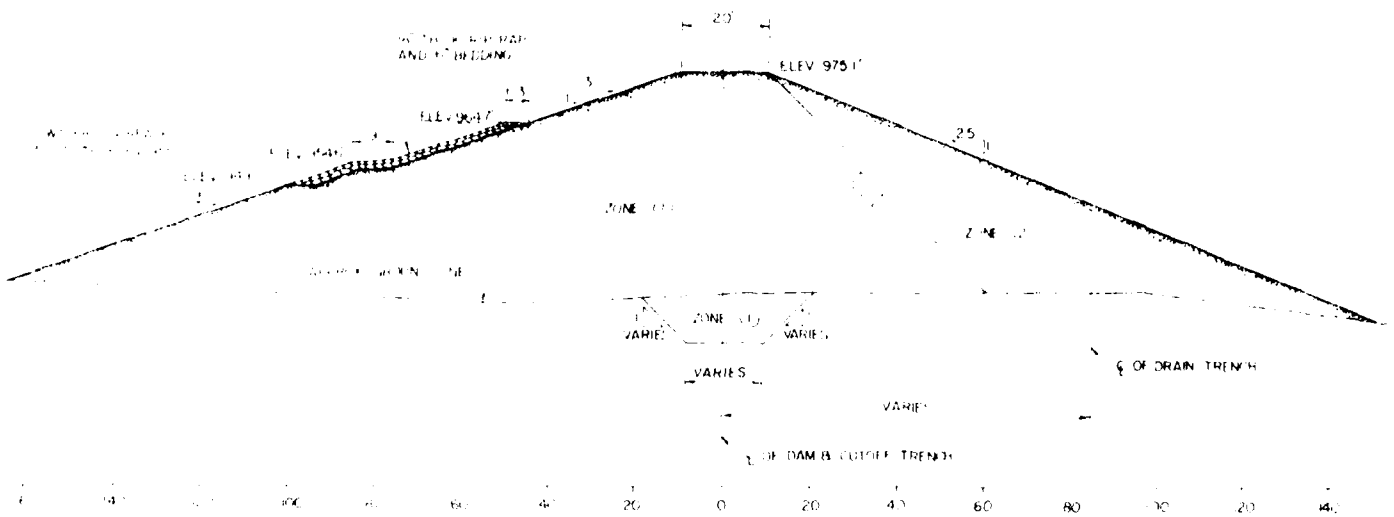
EARTH FILL REQUIREMENTS

ZONE	MATERIAL	REQUIRED WATER CONTENT	COMPACTION DEFINITION
AS INDICATED ON DWG	SILTY SAND AND GRAVEL	OPTIMUM TO +4% OPTIMUM	95% MAXIMUM DENSITY PER ASTM D698 METHOD A
	GRAVEL WITH SAND	WET	4 PASSES OF VIBRATORY ROLLER MIN 7' WIDE WEIGHING MIN 1 TON/FT WIDTH, MIN IMPACT OF 32,200 LBS EL MIN 1200 CYCLES/MIN

RESERVOIR DRAIN OUTLET

℄ 24" REINF CONC PIPE

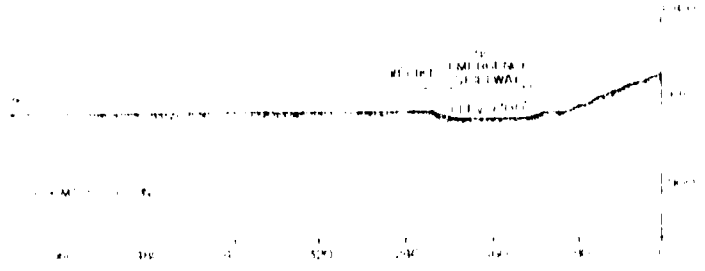
ROCK SLAB



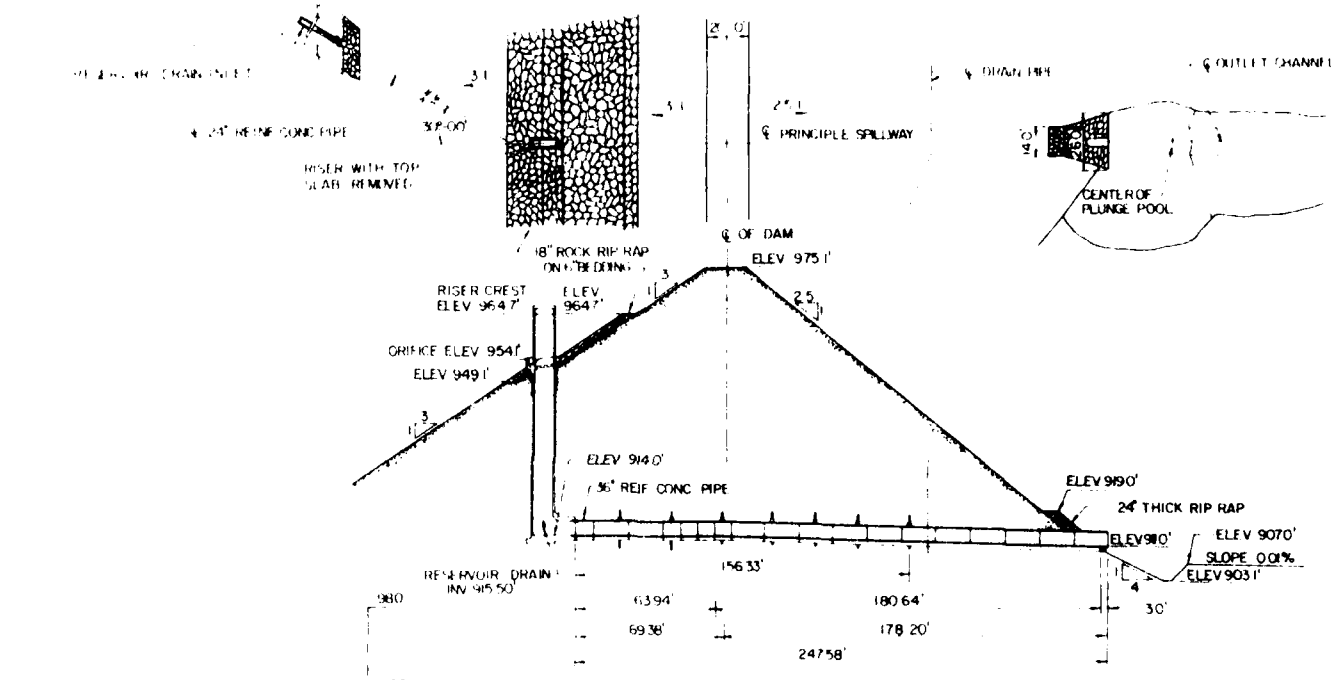
SECTION B-B

FIG 2 of 2

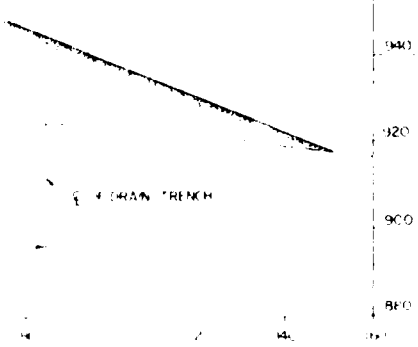
1 of 2



SECTION A-A



SECTION C-C



1. THE INFORMATION SHOWN ON THESE DRAWINGS IS BASED ON THE ORIGINAL CONSTRUCTION PLANS AND VISUAL OBSERVATIONS MADE DURING THE FIELD INSPECTION. DIMENSIONS OR MATERIALS INDICATED ON THESE DRAWINGS WHICH WERE BELOW GRADE OR WATER DURING THE TIME OF INSPECTION WERE NOT VERIFIED.

2. THE ELEVATIONS SHOWN ARE 1929 MSL DATUM

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

SITE NO 6A
BAKER FLOODWATER
TURAS BROOK RESERVOIR WENTWORTH N.H.

Figure 2 of 2

2 of 2

APPENDIX C

PHOTOGRAPHS

FOR LOCATION OF PHOTOS, SEE FIGURE 1
LOCATED IN APPENDIX B

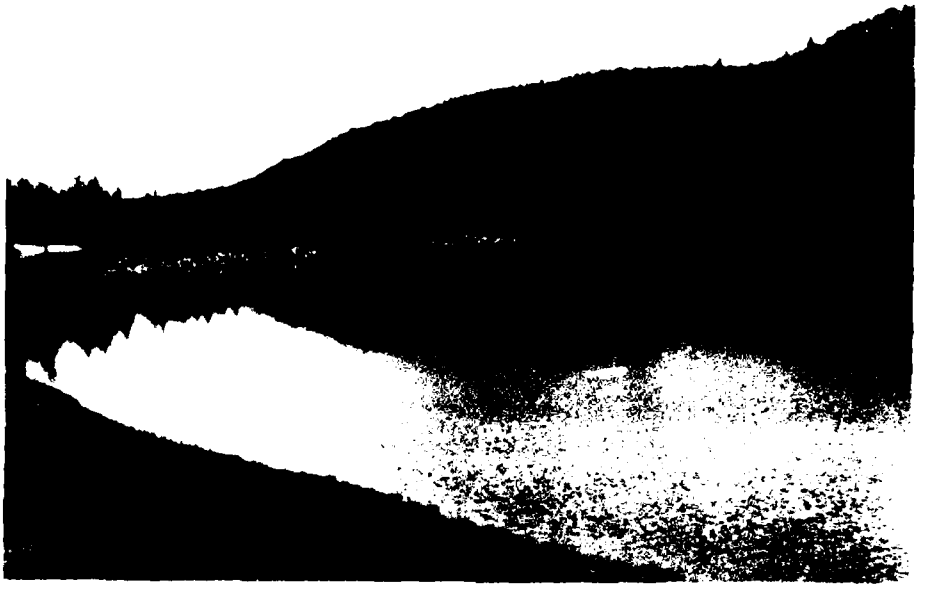


PHOTO NO. 1 - View of dam and portion of reservoir from left bank.

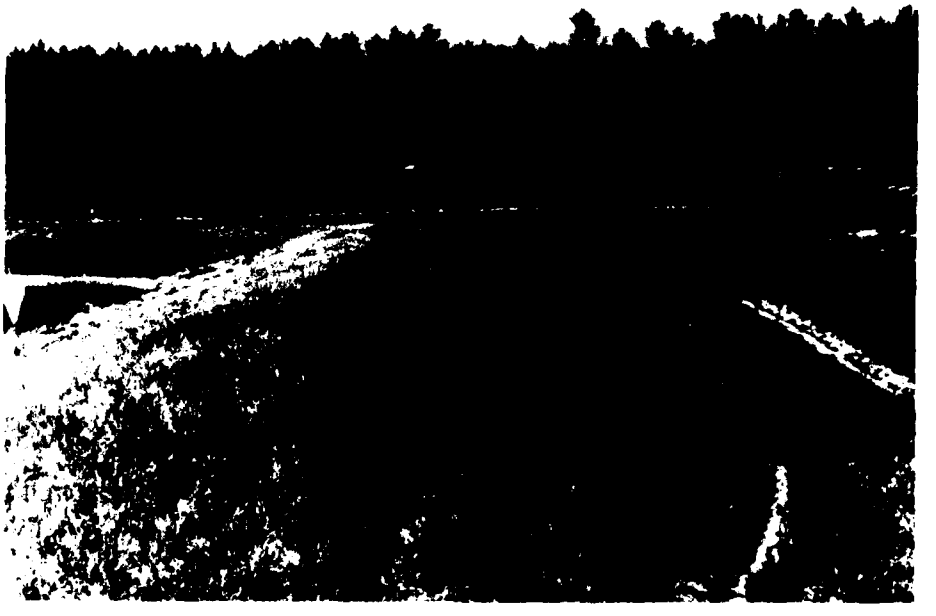


PHOTO NO. 2 - View of dam crest from right abutment.

PHOTO NO. 3 - View of reservoir from right abutment.

PHOTO NO. 4 - Reservoir from left side of reservoir, looking upstream. Note roadway and culvert.

PHOTO NO. 5 - View of upstream slope of dam from right abutment.

PHOTO NO. 6 - Upstream slope of dam and right abutment, from slope adjacent to principal spillway.

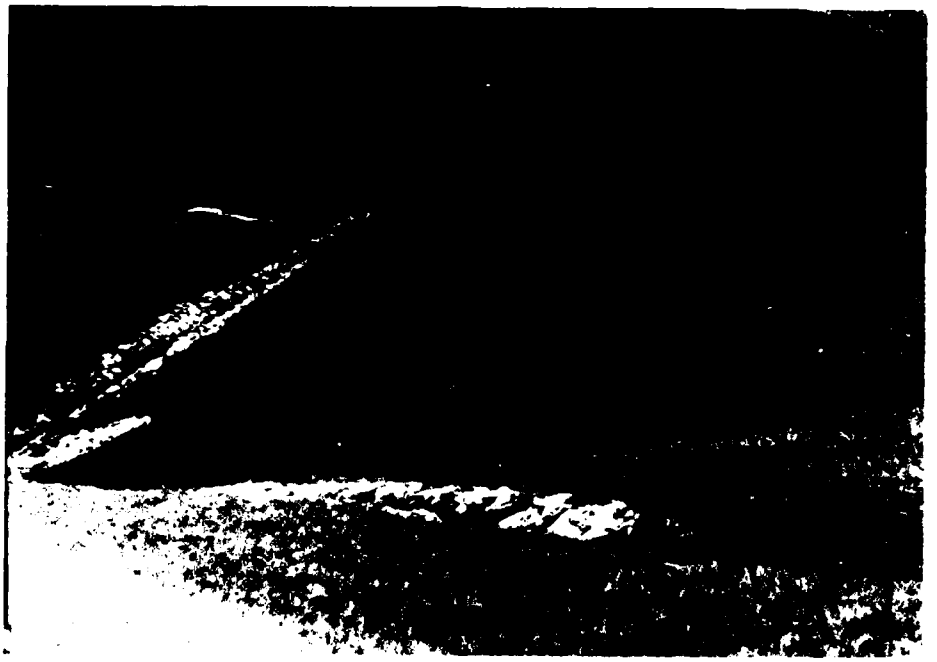


PHOTO NO. 7 - Downstream face of dam from emergency spillway dike.

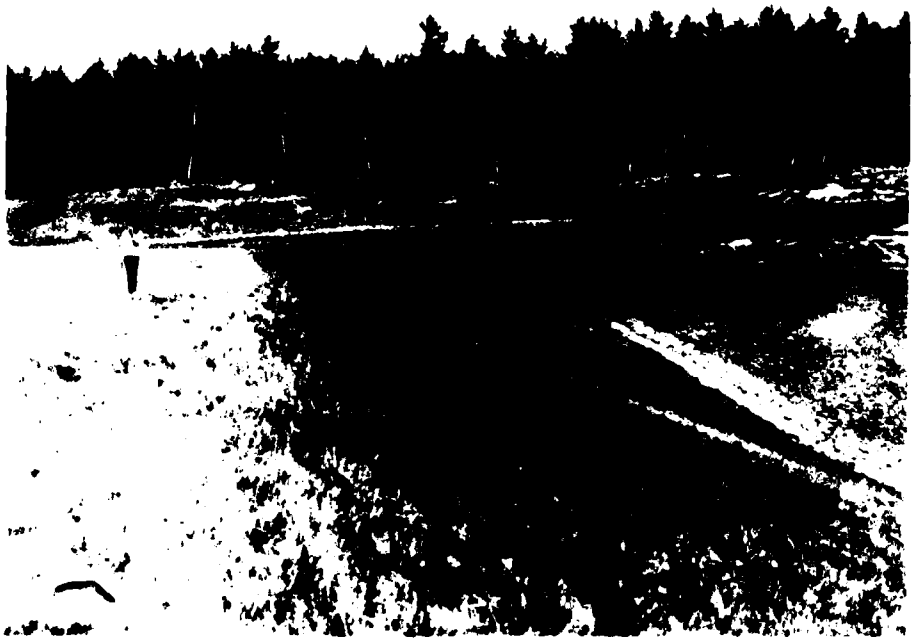


PHOTO NO. 8 - View of downstream face of dam and portion of emergency spillway.

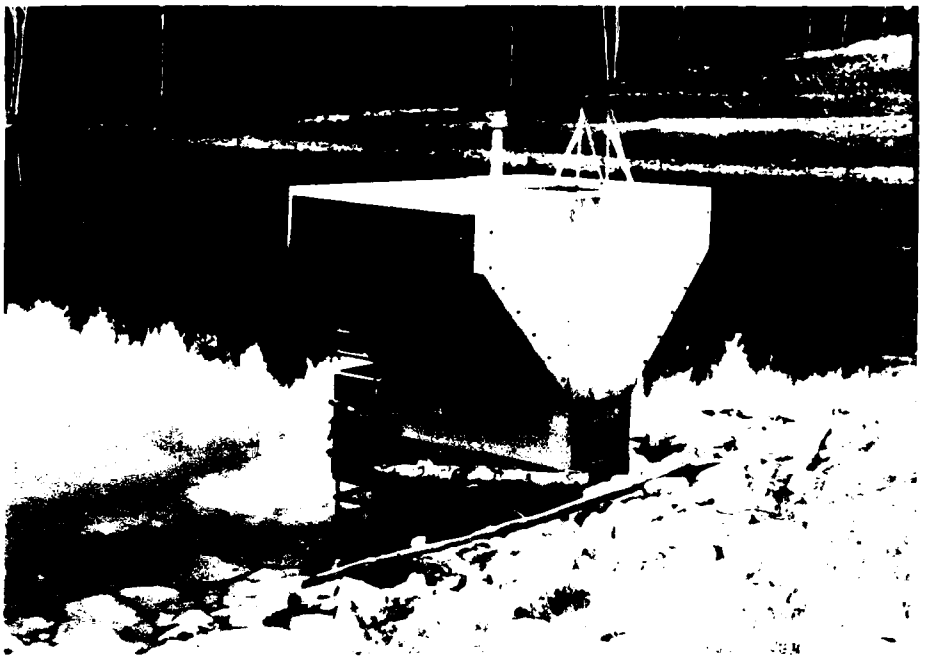


PHOTO NO. 9 - View of right side of riser and principal spillway.

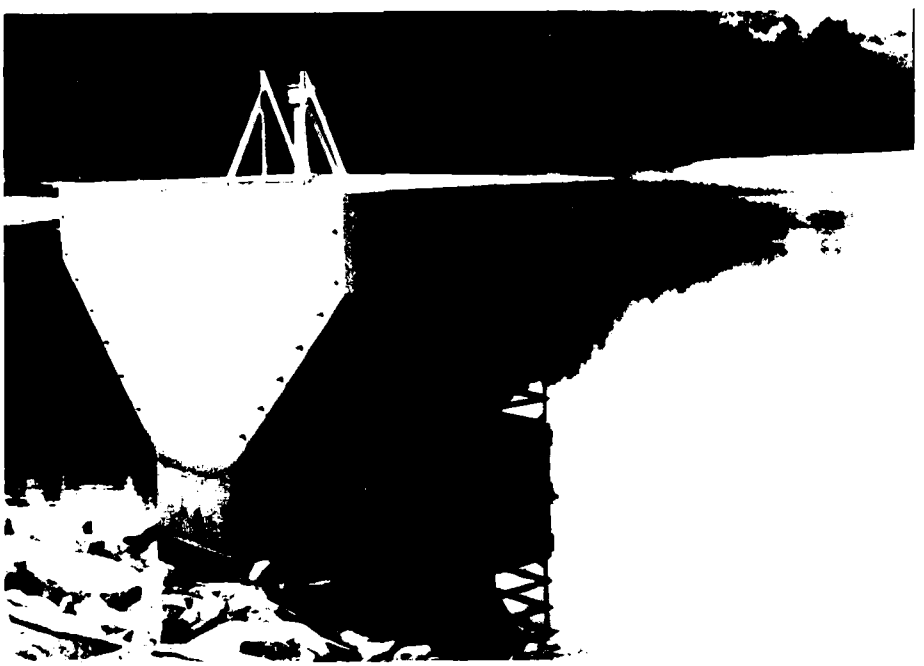


PHOTO NO. 10 - View of left side of riser and principal spillway.

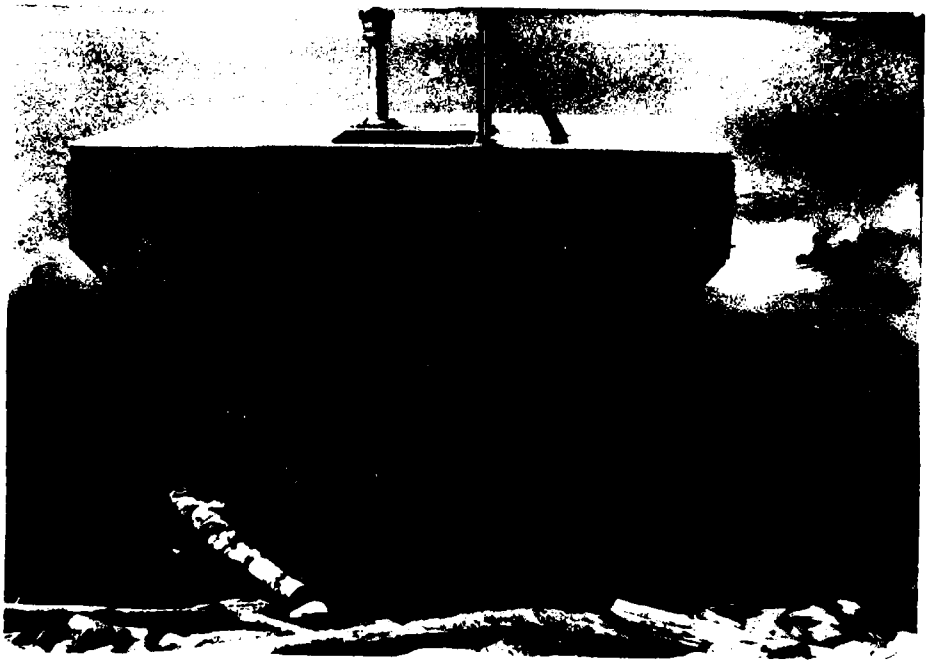


PHOTO NO. 11 - View of downstream side of riser and principal spillway.

PHOTO NO. 12 - View of principal spillway outlet pipe and discharge channel.

PHOTO NO. 13 - View of outlet pipe and plunge pool stilling basin.

PHOTO NO. 14 - View of discharge channel.

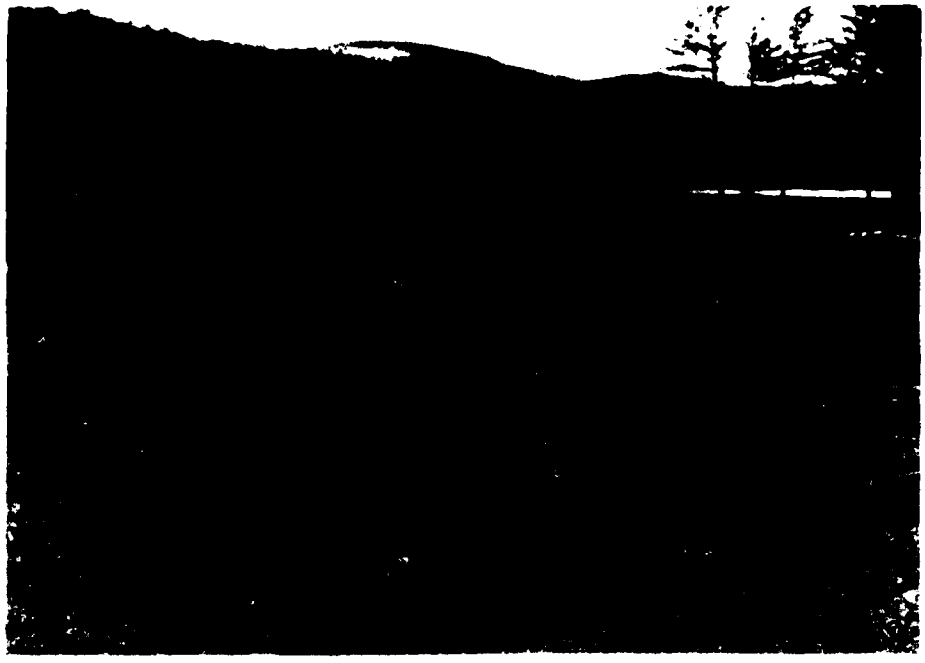


PHOTO NO. 15 - View of upstream portion of emergency spillway.

PHOTO NO. 16 - View of downstream portion of emergency spillway from axis of dam.

PHOTO NO. 17 - View of crest of emergency spillway from spillway channel.

PHOTO NO. 18 - View of emergency spillway outlet, downstream of crest, from dam.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS

INTS

[illegible]ARD NEEDLES TAMMEN & BERGENDOFF

Made by	[illegible]	Date	[illegible]	Job No.	[illegible]
Checked by	[illegible]	Date	[illegible]	Sheet No.	[illegible]

[illegible] #6A

HYDRAULIC & HYDROLOGY

[illegible] Dam #6A is located on the Tural Brook in the Town of Wentworth, N.H. in the Merrimack River Basin.

Classification — Size: Intermediate
Hazard: High

[illegible] — D.A. [illegible] sq. mi.
[illegible]: Mountainous [illegible]
Average Slope [illegible]

Reservoir Retention [illegible]
Storage [illegible]
Max. Top of Dam [illegible] 9[illegible]
Storage [illegible]
[illegible] 771.0 [illegible]
Storage [illegible]

Dam [illegible]
Length 730 ft.
Height 60 ft.

Spillway
[illegible] 7 [illegible]
[illegible] length: [illegible]
[illegible]
width [illegible]

[illegible]

SCS-519
(12-63)

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

HYDROGRAPH COMPUTATION

WATERSHED OR PROJECT _____ STATE _____

STRUCTURE, SITE OR SUBAREA _____

DR. AREA _____ SQ. MI. T_c _____ HR. RUNOFF CONDITION NO. _____

RUNOFF CURVE NO. _____ , STORM DISTRIB. CURVE _____ , HYDROGRAPH FAMILY NO. _____

STORM DURATION _____ HR. RAINFALL: POINT _____ IN. AREAL _____ IN.

Q _____ IN COMPUTED T_p _____ HR. T_o _____ HR.

$(T_o \div T_p)$ COMPUTED _____ USED _____ , REVISED T_p _____

$q_p = \frac{484\ A}{RCV\ T_p}$ = _____ CFS. Qa_p = _____ CFS.

t (COLUMN) = $t \div T_p$ REV T_p q (COLUMN) = $(q_c/q_p)\ Qa_p$

LINE NO	t HOURS	q CFS	LINE NO.	t HOURS	q CFS	LINE NO.	t HOURS	q CFS
1			21			41		
2			22			42		
3			23			43		
4			24			44		
5			25			45		
6			26			46		
7			27			47		
8			28			48		
9			29			49		
10			30			50		
11			31			51		
12			32			52		
13			33			53		
14			34			54		
15			35			55		
16			36			56		
17			37			57		
18			38			58		
19			39			59		
20			40			60		

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

HYDROGRAPH COMPUTATION

WATERSHED PROJECT _____ STATE _____

STRUCTURE OR REACH SUBAREA _____

DR. AREA _____ SQ. MI. T_c _____ HR. RUNOFF CONDITION NO. _____

RUNOFF CURVE NO. _____ STORM DISTRIBUTION CURVE _____ HYDROGRAPH FAMILY NO. _____

STORM DURATION _____ HR. RAINFALL: POINT _____ IN. AREAL _____ IN.

_____ IN. COMPUTED T_p _____ HR. T_o _____ HR.

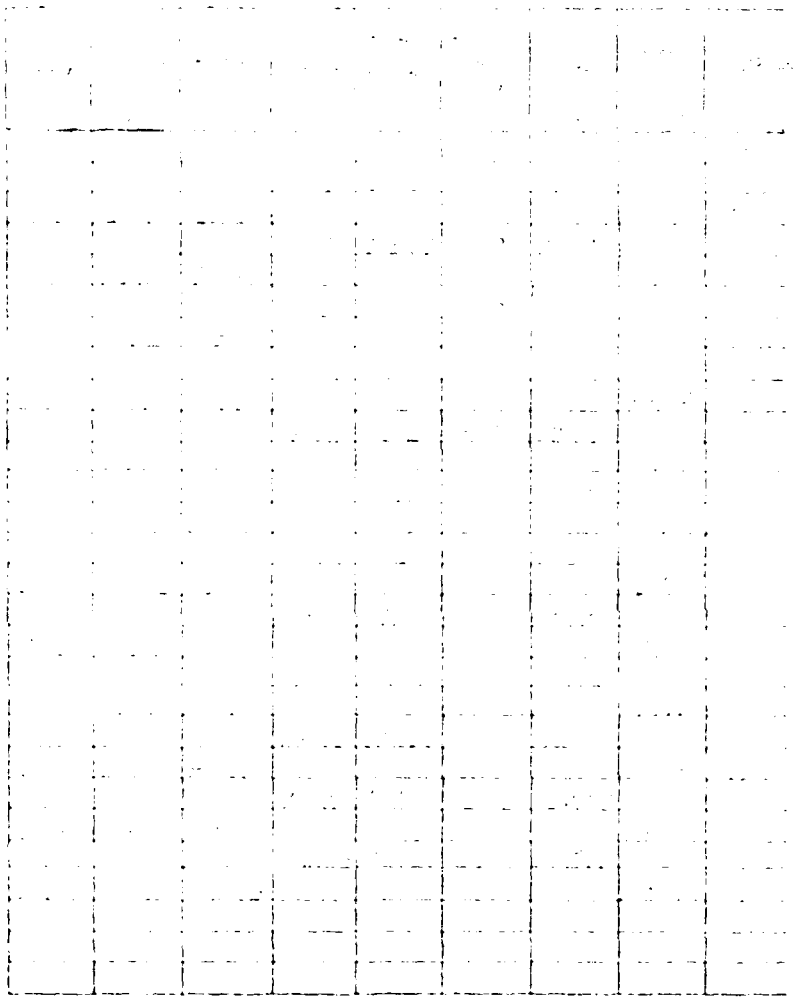
$T_o \div T_p$ COMPUTED _____ USED _____ REVISED T_p _____

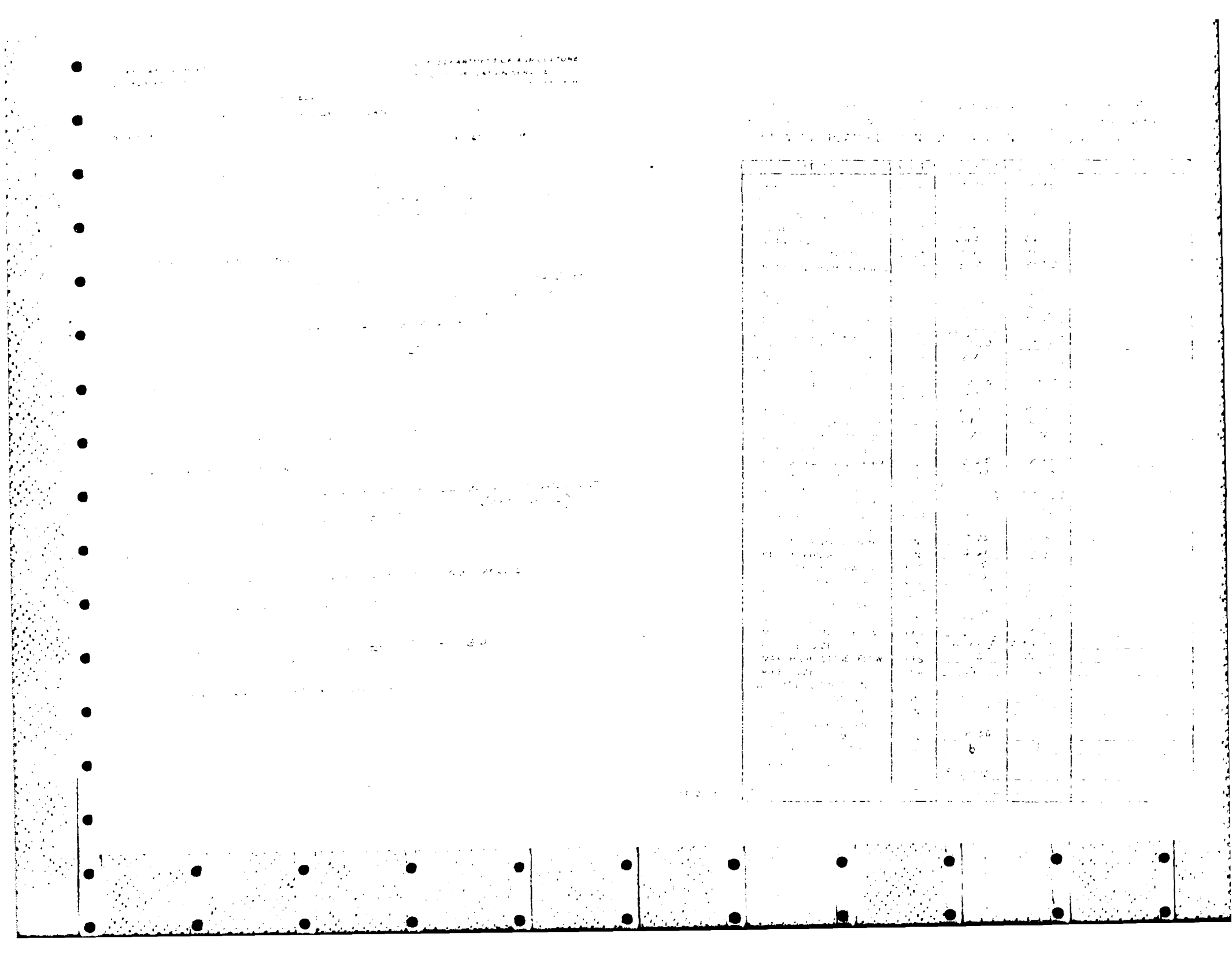
$q_p = \frac{AREA}{484\ T_p}$ = _____ CFS. Q_{ap} = _____ CFS.

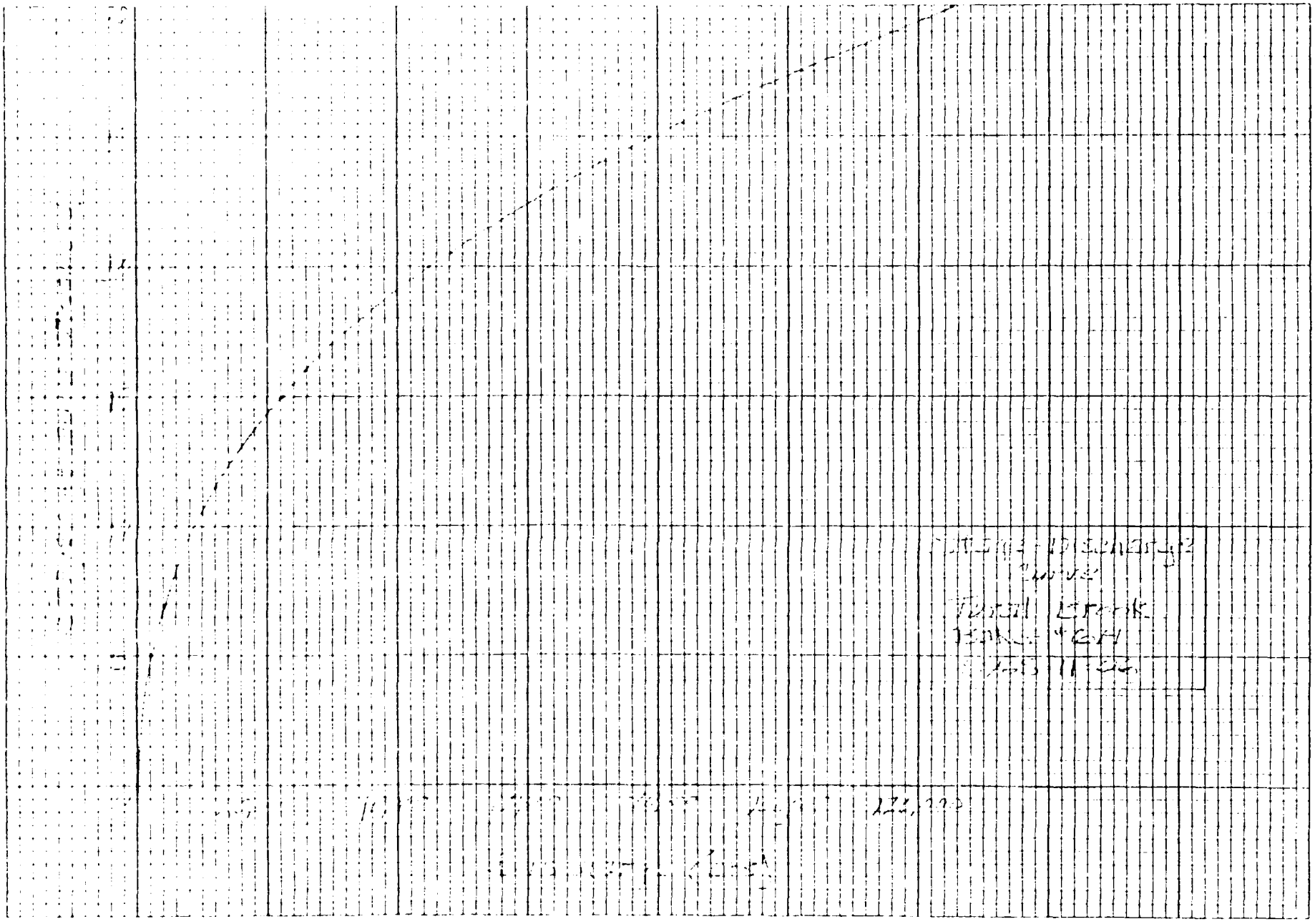
q (COLUMN 3) = (COLUMN 2) $\div T_p$ REVISED T_p

q (COLUMN 5) = (COLUMN 4) $\div T_p$ Q_{ap}

LINE NO.	t HOURS	q CFS	LINE NO.	t HOURS	q CFS	LINE NO.	t HOURS	q CFS
1			21			41		
2			22			42		
3			23			43		
4			24			44		
5			25			45		
6			26			46		
7			27			47		
8			28			48		
9			29			49		
10			30			50		
11			31			51		
12			32			52		
13			33			53		
14			34			54		
15			35			55		
16			36			56		
17			37			57		
18			38			58		
19			39			59		







HNTB
HOWARD NEEDLES TAMMEN & BERGENDOFF

Made by	RY	Date 5/29/79	Job No. 5765-11-06
Checked by	[illegible]	Date 6/[illegible]/79	Sheet No. 7

For Baker 6A

Step 4 Reach Outflow $C = 1209$ acre ft

$Q_{P_1} = 112,200$ cfs

Stage$_1$ = 28.6   area$_1$ = 3475 ft^2

$$V_1 = \frac{3475 \times 7200}{43560} = 574 \text{ acre ft} < \frac{1209}{2}$$

Reach length OK

$$Q_{P_2} = 112,200\left(1 - \frac{574}{1209}\right) = 58,950 \text{ cfs}$$

Stage$_2$ = 22.3 ft   area$_2$ = 2029 ft^2

$$V_2 = \frac{2029 \times 7200}{43560} = 335 \text{ acre ft}$$

V_{ave} = 455 acre ft

$$Q_{P_2} = 112,200\left(1 - \frac{455}{1209}\right) = 70,000 \text{ cfs}$$

Stage = 23.8 ft

HNTB HOWARD NEEDLES TAMMEN & BERGENDOFF	Made by KY	Date 5/29/79	Job No. 3755-11-06
	Checked by [illegible]	Date [illegible]	Sheet No. 6

For [illegible]

Estimate of Downstream Damage

Step 1 Reservoir Storage

Top of Dam @ elev 975.1
Storage 1209 acre-ft

Step 2 [illegible] Outflow

Q_{max} = 8/27 [illegible] $W_b\, Y_0^{3/2}$

[illegible] Dam length = [illegible]

[illegible]

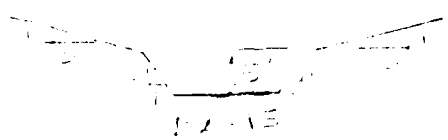
[illegible] 8/27 [illegible] = [illegible]

[illegible] = 1712 [illegible]

[illegible] = [illegible]

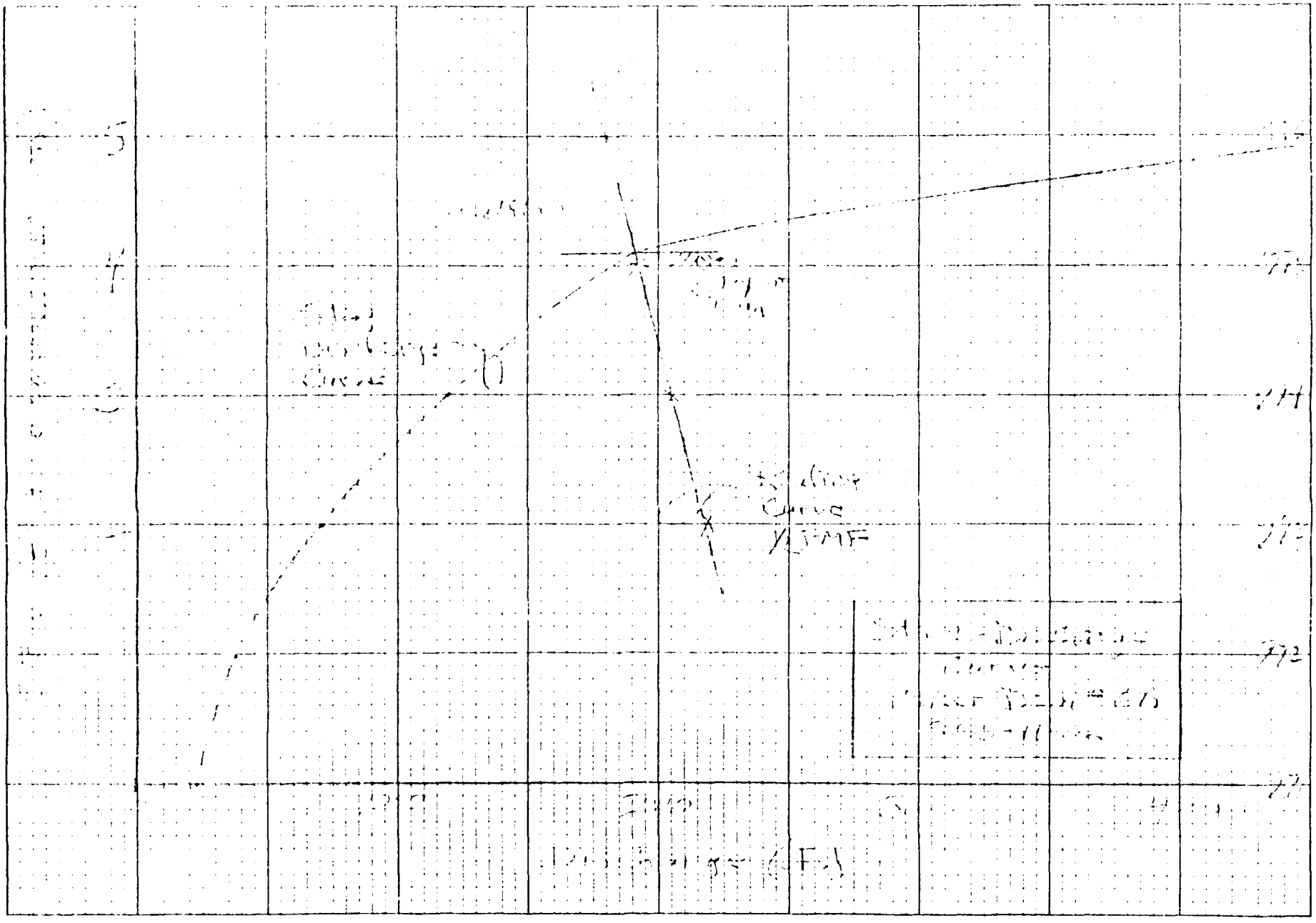
Step [illegible] [illegible]

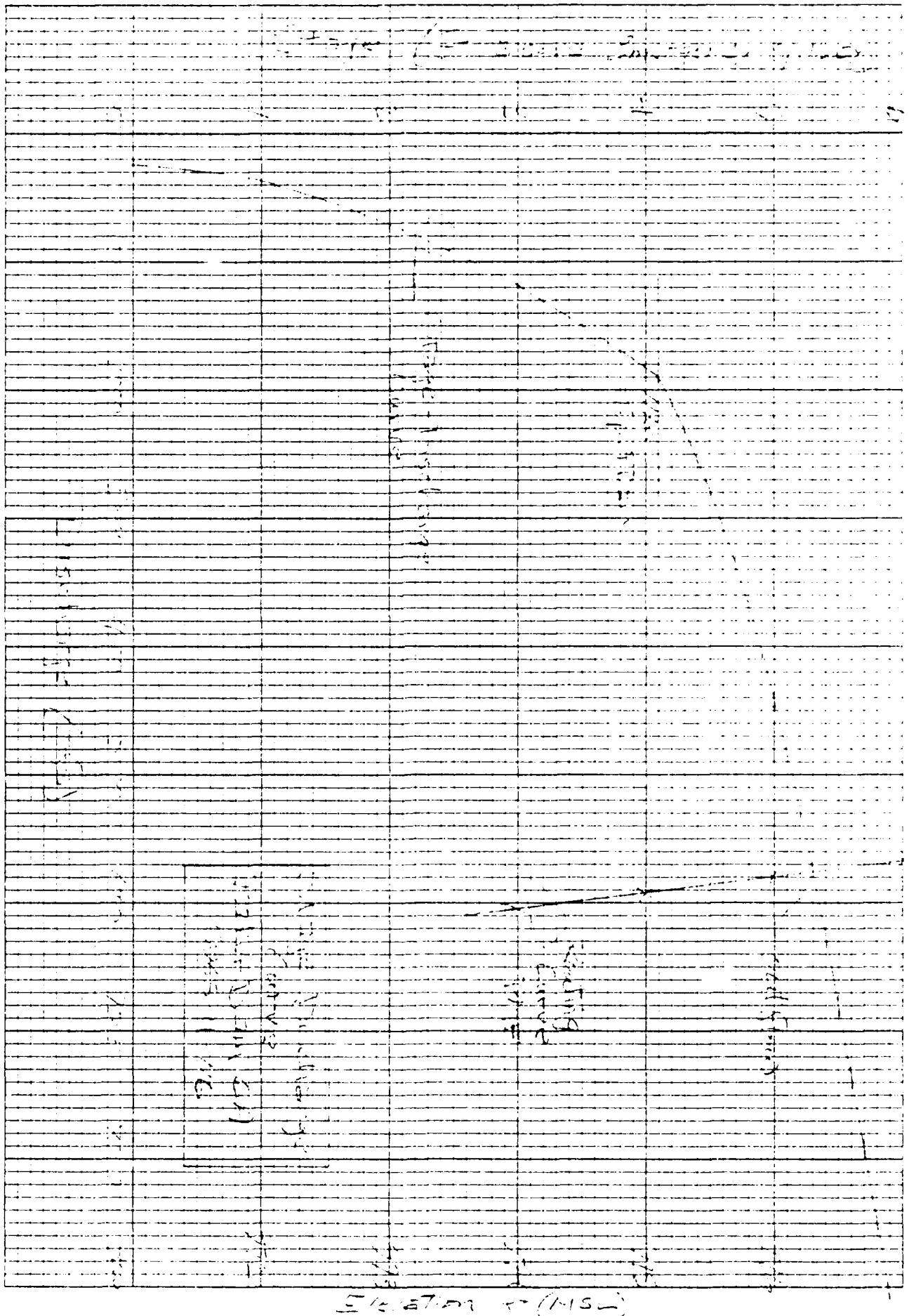
[illegible] = 25
[illegible] 0 [illegible]

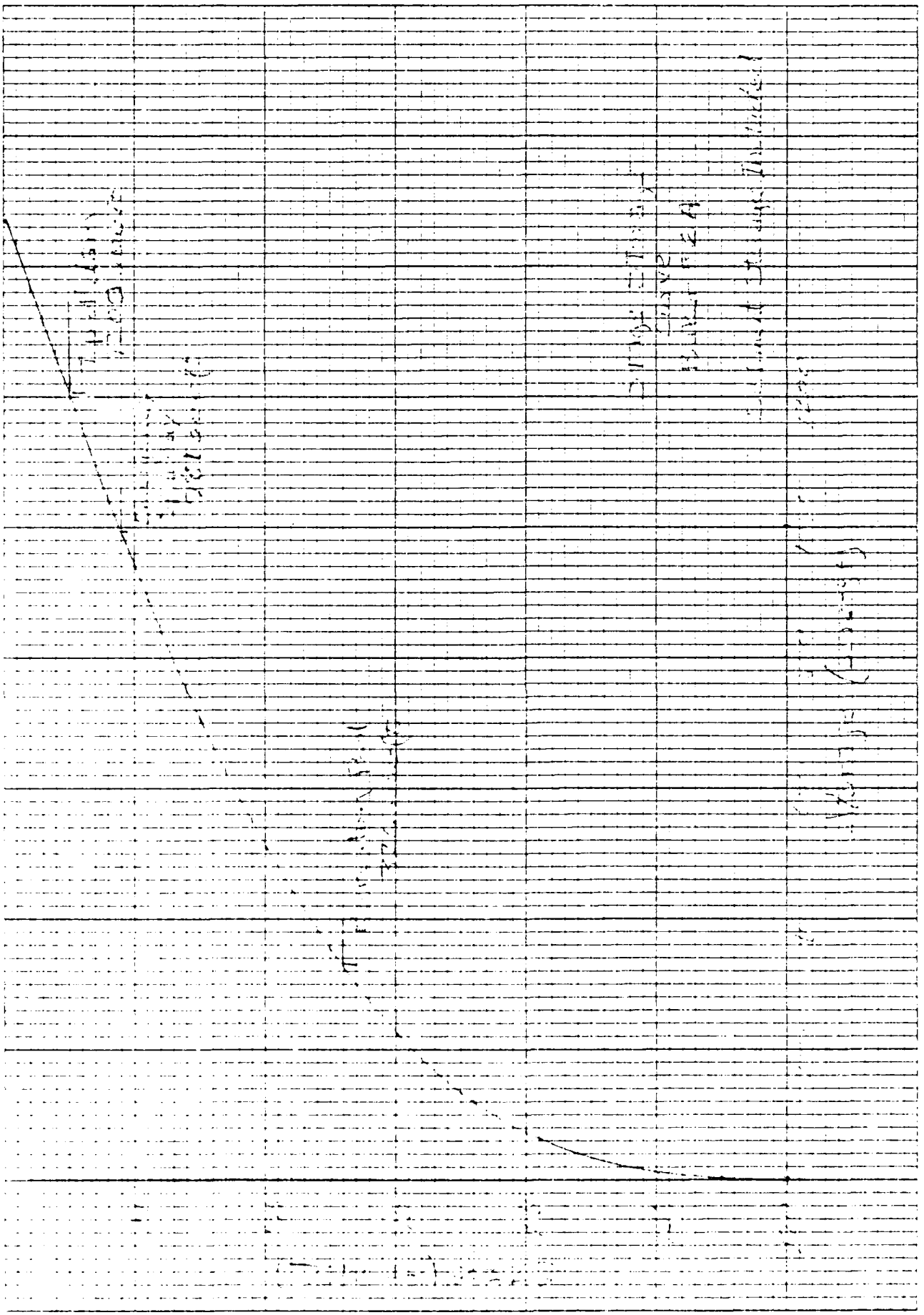


[illegible] = [illegible]
Channel = .0[illegible]
$C_{[illegible]}$ = .4
$n_{[illegible]}$ = .0[illegible]

[illegible]	[illegible]
[illegible]	2[illegible]
[illegible]	7600
[illegible]	22,100
[illegible]	[illegible]
[illegible]	7[illegible],200
30	15,4[illegible]







HNTB

HOWARD NEEDLES TAMMEN & BERGENDOFF

Made by [illegible]	Date [illegible]	Job No. [illegible]
Checked by [illegible]	Date [illegible]	Sheet No. 5

For [illegible]

[illegible] DMF

$Q_{?} = 4000$ [illegible]   [illegible] = [illegible] inches

$= Q_{?} \left(1 - \frac{[illegible]}{93}\right)$

[illegible] from [illegible] 526 [illegible]

$= \frac{[illegible] \times [illegible]}{335 [illegible] \times 640 [illegible]} =$ [illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]9	431	[illegible]
[illegible]	[illegible]	463	[illegible]
[illegible]	183	[illegible]	1925
[illegible]	134	523	[illegible]

[illegible] Figure 3 [illegible]

From Figure 3 [illegible]

[illegible]

[illegible]

[illegible]

HNTB HOWARD NEEDLES TAMMEN & BERGENDOFF	Made by RY	Date [illegible]	Job No. [illegible]
	Checked by [illegible]	Date [illegible]	Sheet No. 4
For Lake 6A			

Step 3 Estimate of Surcharge Effect

$Q_{P1} = 1000$ cfs   Runoff = 19 inches

$$Q_{P2} = Q_{P1}\left(1 - \frac{Stor}{19}\right)$$

Stor in acre-ft read from Figure 1 minus [illegible] acre-ft

$$Stor(in) = \frac{Stor\ acre\text{-}ft \times 12\ in/ft}{3.35\ sq\ mi \times 640\ acres/mi^2} = .0056\,(Stor)$$

Elev	Stor (acre-ft)	Stor (in)	Q_{P2} cfs
[illegible]3	[illegible]69	4.31	[illegible]185
[illegible]	726	4.53	6050
[illegible]5	773	4.94	5920
[illegible]	934	5.23	5[illegible]0
[illegible]	[illegible]	5.54	5670

See Figure 2 for Plot and Final outflow

From Figure 2 Outflow [illegible] cfs

Stage 976.3 [illegible]

12 [illegible]

HNTB
HOWARD NEEDLES TAMMEN & BERGENDOFF

Made by [illegible]	Date [illegible]	Job No. [illegible]
Checked by [illegible]	Date [illegible]	Sheet No. 3

For [illegible]

Step 2 Calculation of Test Flood Surcharge

Stage – Discharge Curve

Elev	Feet above [illegible]	A Riser Pipe Flow	B Emergency Spillway	C Crest of Dam	Total
771	0	227 cfs	–	–	229 cfs
[illegible]	1	231	133 cfs	–	[illegible]
[illegible]	2	233	470	–	793
[illegible]	3	235	[illegible]	–	[illegible]
[illegible]	4	237	1515	–	[illegible]
776	5	[illegible]	2325	1925	[illegible]
777	6	241	[illegible]	[illegible]	9781
[illegible]	7	[illegible]	4125	11,722	[illegible]
[illegible]	[illegible]	[illegible]	1663		1900

A. [illegible] Dam Book [illegible]

B. [illegible]

C. [illegible]

$Q = CLH^{3/2}$

$C = 3.09$

$L = 730$

$Q = 2256\, H^{3/2}$

HNTB

HOWARD NEEDLES TAMMEN & BERGENDOFF

Made by: JY	Date: [illegible]	Job No.: [illegible]	
Checked by: [illegible]	Date: [illegible]	Sheet No.: 2	
For: Site #6A			

Step #1 Calculation of Test Flood Inflow

Classification: Size: Intermediate
Hazard: High

Hydrologic Evaluation of Guidelines - Recommends use of full PMF

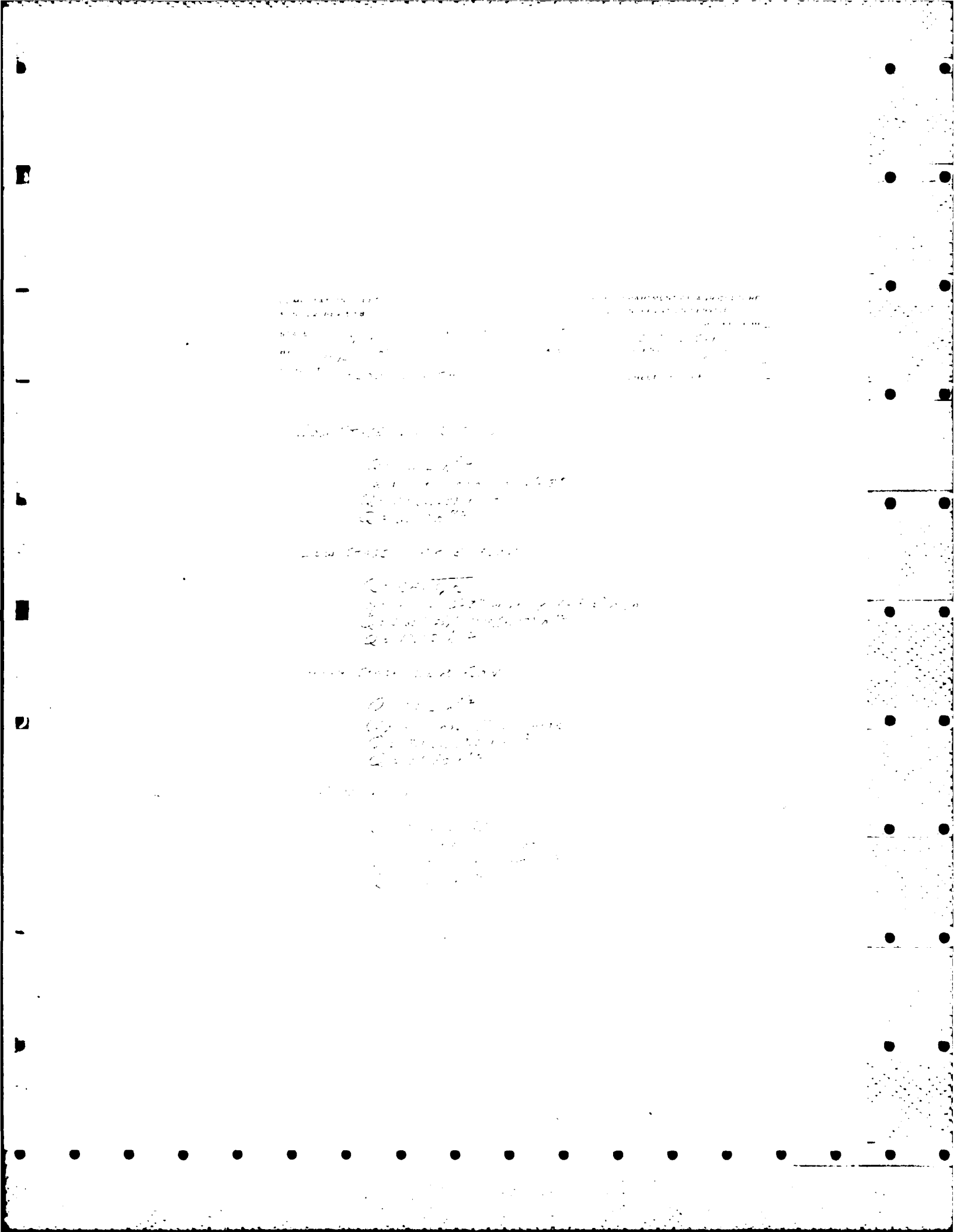
There is no range of values for this classification -

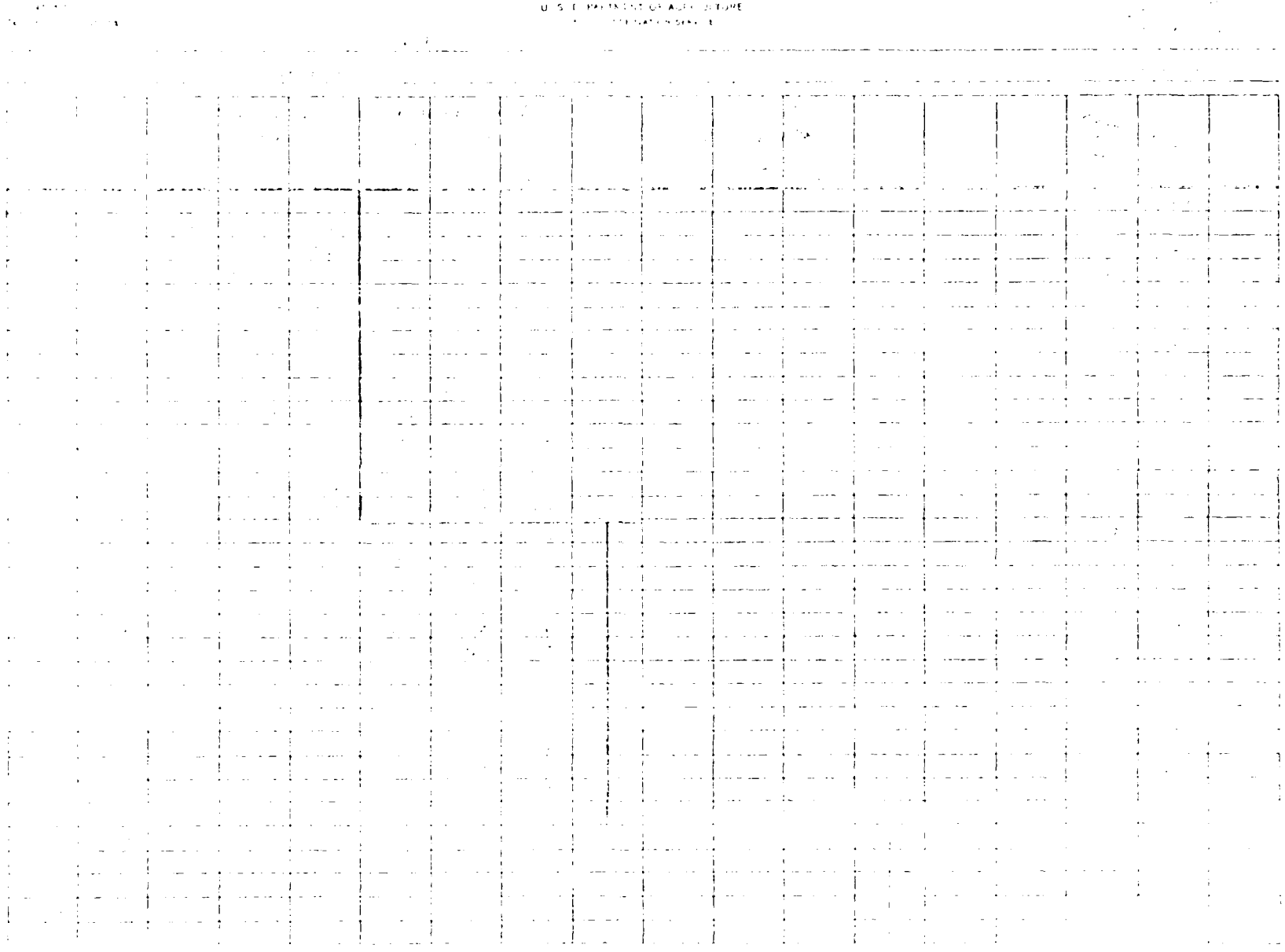
Use Mountainous curve as basin slope is approximately 400 ft/mi.

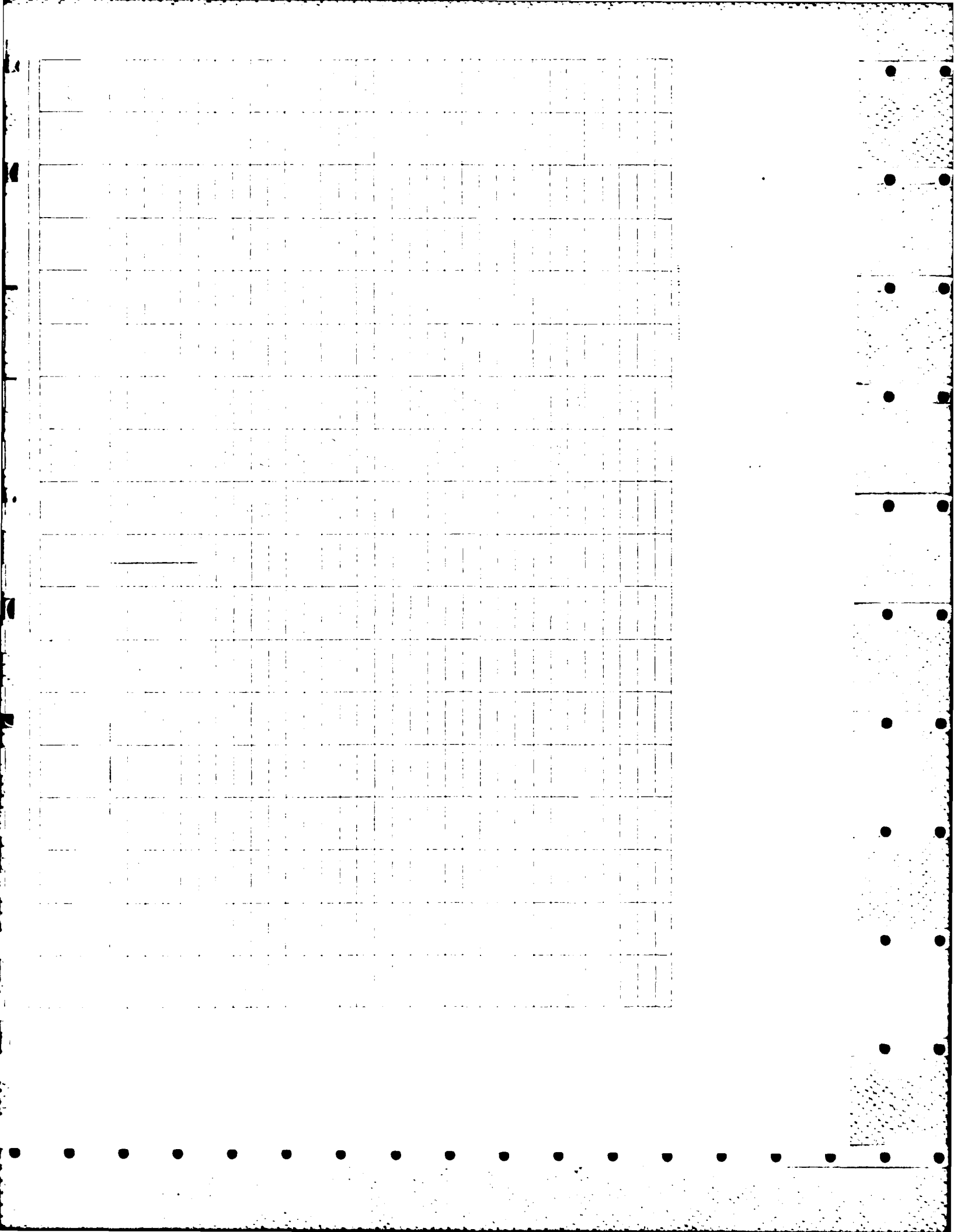
PMF = 2280 csm

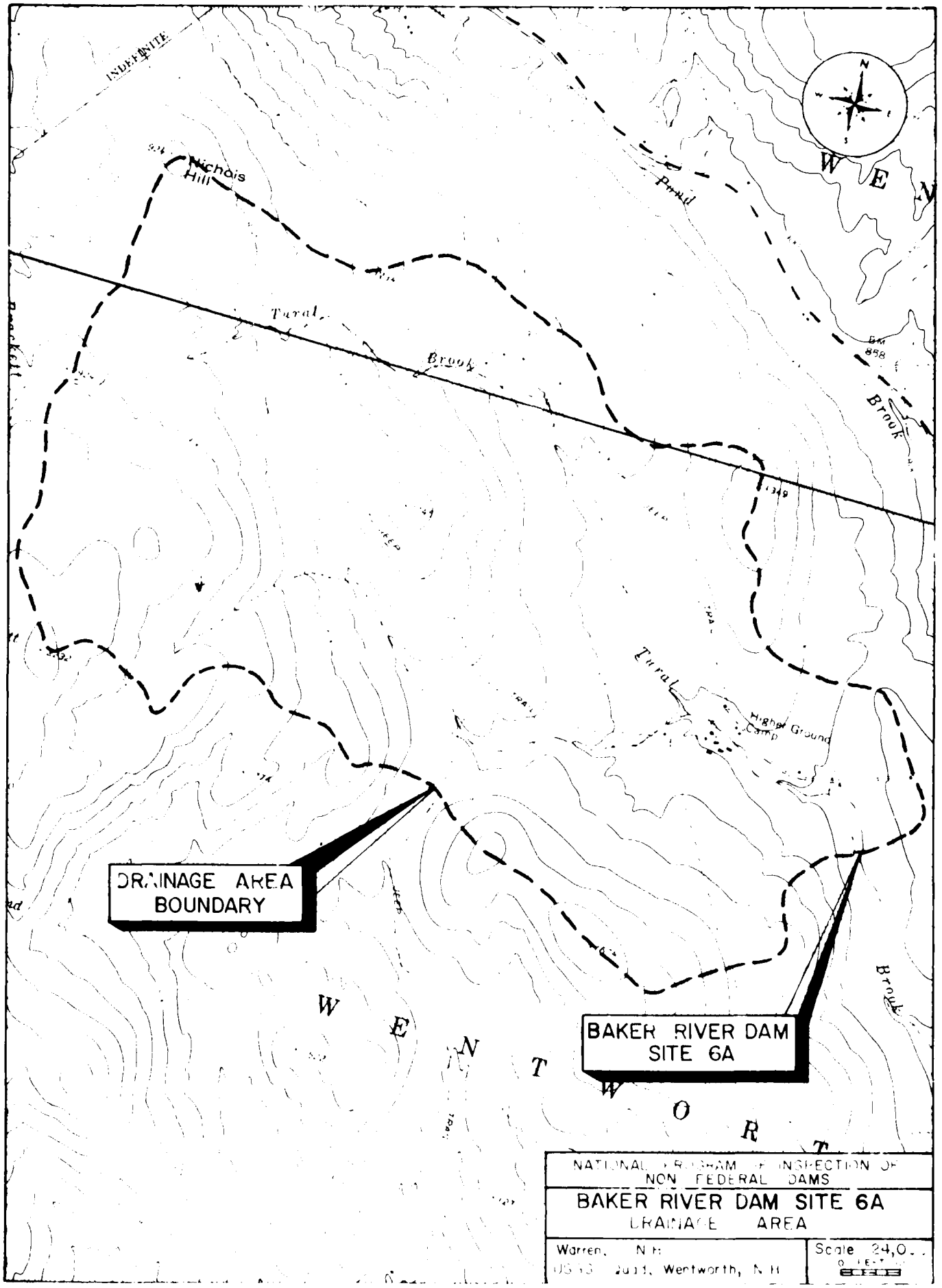
Test Flood Inflow = 2280 × 3.35 mi² = 7600 cfs

As this is a flood control reservoir, the [illegible] storage volume above the [illegible] [illegible] can be used to store PMF runoff.









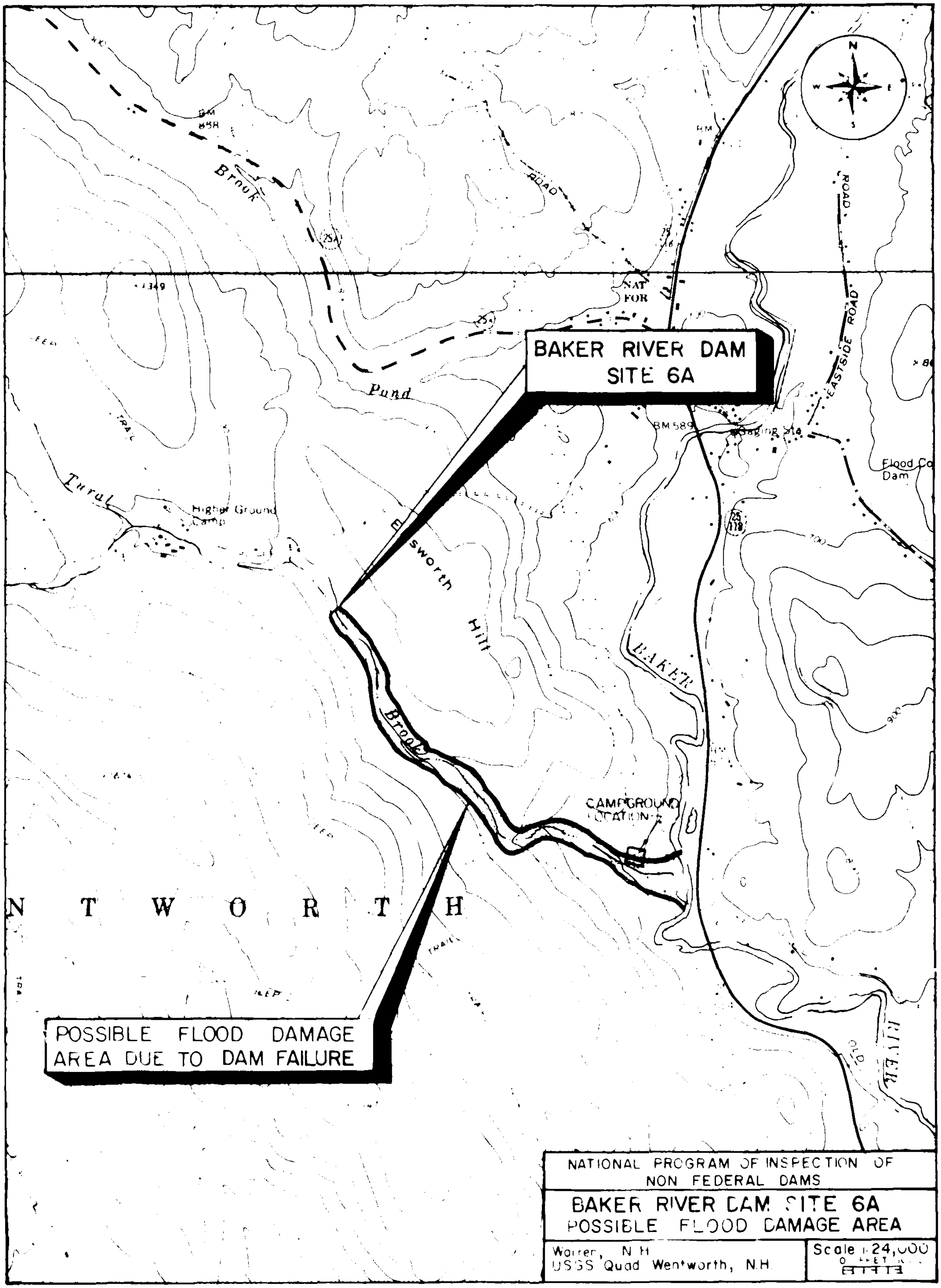
NATIONAL PROGRAM OF INSPECTION OF NON FEDERAL DAMS

BAKER RIVER DAM SITE 6A

DRAINAGE AREA

Warren, N.H.
USGS Quad, Wentworth, N.H.

Scale 24,0..


BAKER RIVER DAM
SITE 6A
POSSIBLE FLOOD DAMAGE
AREA DUE TO DAM FAILURE
Brook
Pond
Tural
Higher Ground Camp
Ellsworth
Hill
Brook
BAKER
RIVER
CAMPGROUND LOCATION
BM 589
Gaging Sta
Flood Co
Dam
EASTSIDE ROAD
ROAD
N T W O R T H
NAT FOR
NATIONAL PROGRAM OF INSPECTION OF
NON FEDERAL DAMS
BAKER RIVER DAM SITE 6A
POSSIBLE FLOOD DAMAGE AREA
Warren, N.H.
USGS Quad Wentworth, N.H.
Scale 1:24,000

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

STATE	IDENTIFICATION NUMBER	STATE	COUNTY	CONGR DIST	STATE	COUNTY	CONGR DIST	NAME	LATITUDE (NORTH)	LONGITUDE (WEST)	REPORT DATE DAY	MO	YR
NM	[illegible]	NM	009	02				BAKER FLOODWATER RESERVOIR SITE 6A	4351.3	7155.6	22	JUN	79

POPULAR NAME	NAME OF IMPOUNDMENT
GRUVER C BRECK DAM	

REGION	BASIN	RIVER OR STREAM	NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	DIST FROM DAM (MI)	POPULATION
01	08	TURAL BROOK	WEST RUMNEY	5	

TYPE OF DAM	YEAR COMPLETED	PURPOSES	STRUCTURAL HEIGHT (FT)	HYDRAULIC HEIGHT (FT)	IMPOUNDING CAPACITIES MAXIMUM (ACRE FT)	NORMAL (ACRE FT)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
REPG	1975	CR	65	60	1209	526	NED	N	N	N	B	

REMARKS

DIS HAS	SPILLWAY CAP (CFS)	SPILLWAY TYPE	SPILLWAY WIDTH (FT)	MAXIMUM DISCHARGE (FT)	VOLUME OF DAM (CY)	POWER CAPACITY INSTALLED (MW)	POWER CAPACITY PROPOSED (MW)	NAVIGATION LOCKS NO	LENGTH (FT)	WIDTH (FT)	LENGTH (FT)	WIDTH (FT)	LENGTH (FT)	WIDTH (FT)	LENGTH (FT)	WIDTH (FT)
2	750	U	80	1663	126995											

OWNER	ENGINEERING BY	CONSTRUCTION BY
N M WATER RESOURCES BD	SOIL CONSERVATION SER	ROBIE CONSTRUCTION COINC

REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	NONE	NONE

INSPECTION BY	INSPECTION DATE DAY	MO	YR	AUTHORITY FOR INSPECTION
HOWARD NEEDLES TAMMEN BERGENDOFF	17	MAY	79	PUBLIC LAW 92-367

REMARKS

END

FILMED

9-85

DTIC